The OIL WEEKLY

FOR THE DRILLING, PRODUCING, PIPE LINE INDUSTRY

MAY 27 1946

ST ENGINEERING

Specify the bits that require LESS WEIGHT

REED ROCK BITS

for

FASTER-STRAIGHTER
FULL GAUGE HOLE

"REEDITE" HARD FACING
ASSURES LONGER
CUTTER LIFE

REED ROLLER BIT COMPANY

IN TWO SECTIONS (SECTION 1)

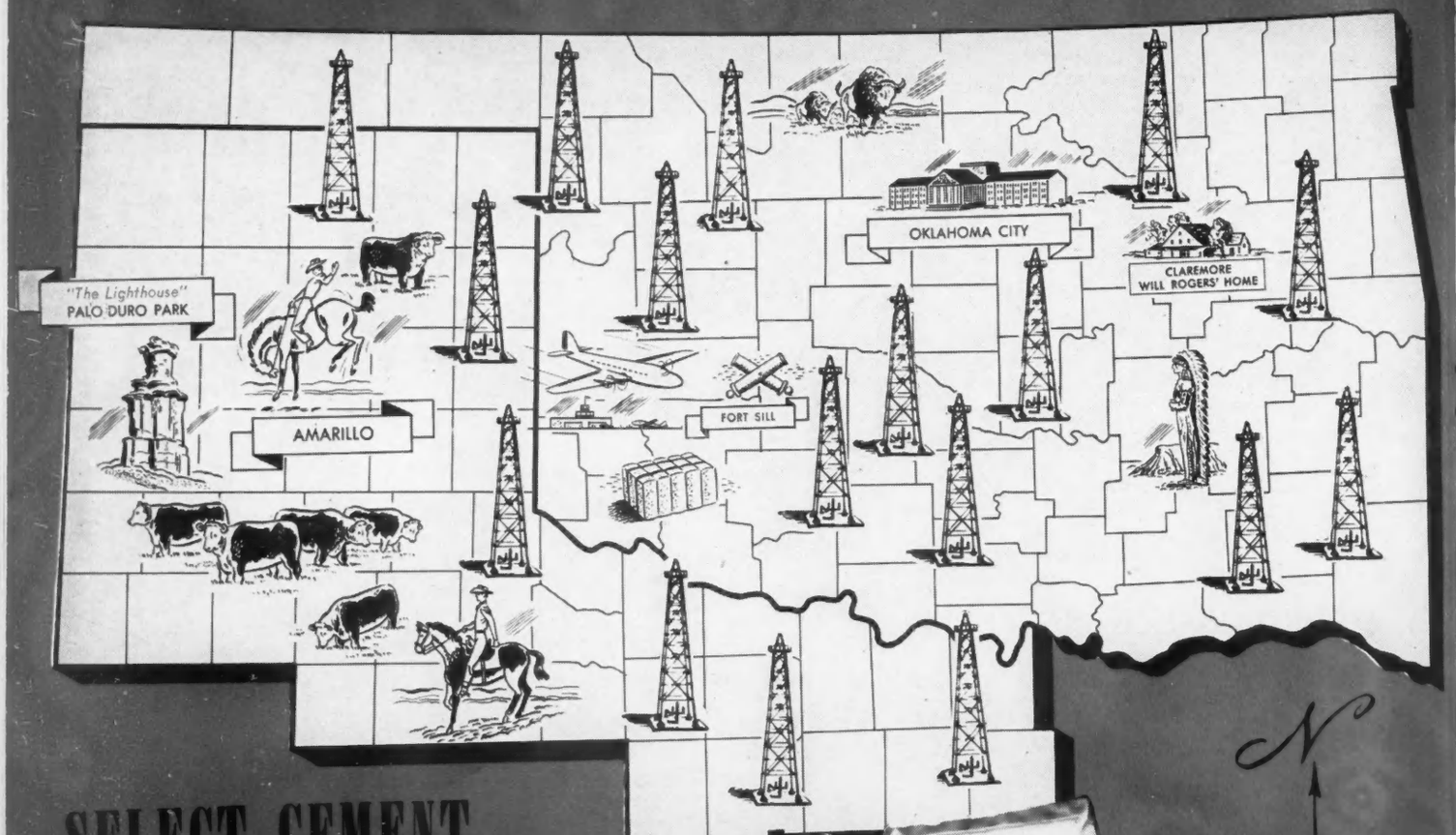
May 20, 1946

VOLUME 121, NUMBER 12

Dependability

. . . in the North Texas, Panhandle and Oklahoma Area

Take advantage of the time-tested dependability of Lone Star Cements . . . dependability proved by outstanding performance in thousands of wells in this and other principal oil-producing areas. Pre-tested performance based on continuing tests in Lone Star Oil-Well Cement Research Laboratory . . . unvarying uniformity assured by rigid control over mill production. Protect your oil-well investment by using an Oil Man's cement . . . select the one that fits your job.



SELECT CEMENT TO FIT THE JOB

LONE STAR CEMENT CORPORATION

DALLAS • HOUSTON

The OIL WEEKLY

ENGINEERING NEWS STATISTICS

Published by THE GULF PUBLISHING COMPANY, Houston, Texas

R. L. DUDLEY, *President, Publisher* A. L. BURNS, *General Manager*

TOM W. NELSON, *Advertising Manager*

Specialized Oil Publications of
THE GULF PUBLISHING COMPANY

The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipe line industry

PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

ADVERTISING STAFF

DICK SWINSKY, ROBERT N. CAIRD, JR., NELSON BIGELOW ..... New York
ROGERS B. FARSON ..... Cleveland
H. G. FITZPATRICK ..... Chicago
J. F. CARTER, JR. ..... Tulsa
J. W. CURTS ..... Los Angeles
CHARLES WYATT, BILL ATCHESON ..... Houston

BRANCH OFFICES

NEW YORK ..... 250 Park Ave. (17)
CLEVELAND ..... 1010 Euclid Ave. (15)
CHICAGO ..... 332 S. Michigan Ave. (4)
LOS ANGELES ..... W. W. Wilson Bldg. Huntington Park, Calif.
TULSA ..... Hunt Bldg. (3)
FORT WORTH ... W. T. Waggoner Bldg. (2)
WASHINGTON ..... Albee Bldg. (5)

CIRCULATION DEPARTMENT

J. HOWARD DONAHUE ..... Manager

Member Audit Bureau of Circulation and Associated Business Papers, Inc.

EDITORIAL STAFF

WARREN L. BAKER, *Editor*
SILAS B. RAGSDALE, *Managing Editor*
L. J. LOGAN, *Associate Editor*

DISTRICT EDITORS

BERTRAM F. LINZ ..... Washington
H. H. KING ..... Fort Worth
GEORGE O. IVES, HENRY OZANNE ..... New York
ANTHONY GIBBON, JAMES S. CRITZ ..... Tulsa
GILBERT M. WILSON ..... Los Angeles
R. W. BYRAM ..... Austin
GORDON B. NICHOLSON, AL REESE, WELDON B. HILL, J. E. KASTROP, C. CLYDE PRYOR ..... Houston

Looking Ahead

WITH THE EDITOR

OIL men dealing with the complicated problems of costs, incomes, insurance, risk and the many financial angles involved in drilling an oil well, seldom stop to check the mathematics of fundamental engineering problems arising during normal drilling operations.

With a few simple, fundamental facts, the operator or contractor can follow and check calculations made which may economically effect a $100,000 investment. "Mathematics of Cementing and Other Problems," by Roy E. Edwards of Halliburton Oil Well Cementing Company, is a refresher on the fundamental mathematics involved in the calculations used in normal cementing problems. In addition to presenting a good background for understanding such an operation, basic principles of mathematical considerations used in other oil and gas calculations are given. For those who are familiar with the mathematics of cementing problems, an excellent review may be found. This article, in four parts, will begin in the May 27 issue of THE OIL WEEKLY.

Contents — MAY 20, 1946

VOLUME 121, No. 12

The Changing Panorama 23

Technical and Feature Articles:

Drilling Tower for Continental Shelf Use 34
By GORDON B. NICHOLSON

Paraffin Control of Pumping Wells by Hydraulic Power 36
By GILBERT M. WILSON

Effective Management, Part 5 41
By G. M. FITZGERALD

Varying Mud Power Pump Speeds 44
By G. C. MACDONALD

Upward Drilling Trend Maintained in April 54

Truck Mounted Hoisting Frame 55
By WALTER L. RUSS

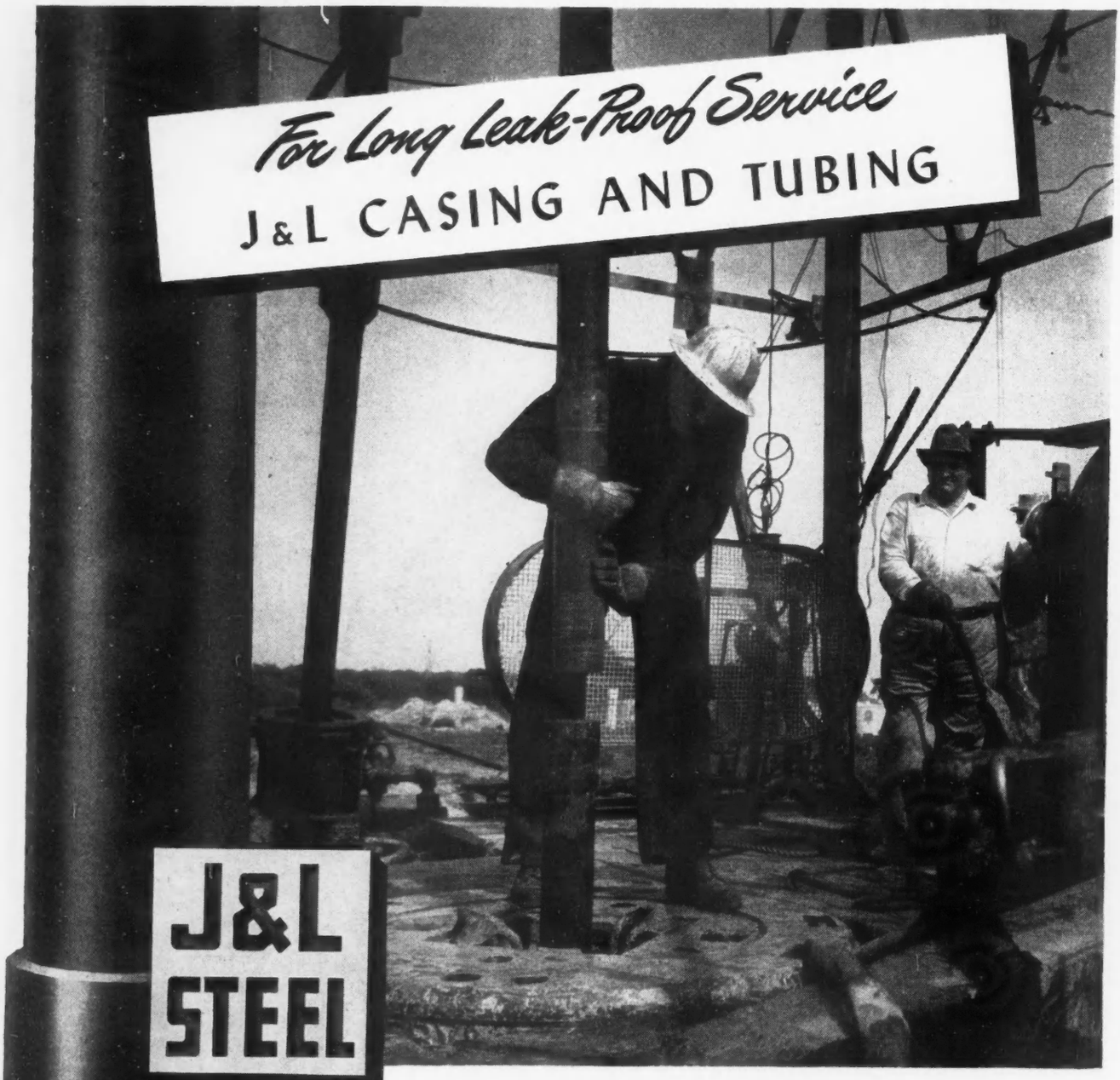
Pipe Line Hints 56

Drilling Hints 58

News and Departments:

Looking Ahead 19
The Outlook 21
The Week's News 23
Patent Roundup 29
Crude Production 29
API Production Division Meeting 30
Tax Review 53
New Equipment, Laterature 65
International News 68
Market Trends 70
Pipe Line News 71
Field Operations 73
Exploratory Completions 88
Wildcat Starts 90
Squeaks from the Bull Wheel 91
Men in the Industry News 92
Manufacturers' Notes 95
The Oil Man's Calendar 96
Advertisers' Index 96

Published Every Monday. Single Copies 15 cents (Except Special Issues). Subscription price: domestic and foreign, $2.00 a year; 2 years, $3.00; 3 years, $4.00. Advertising rates on application. Copyright 1946 by The Gulf Publishing Company.



The logs of thousands of wells reveal that J&L casing or tubing gives long trouble-free service. The experience and skill of J&L men, J&L Controlled Quality Steel, and precision threading are combined to produce for you strong, leak-resistant strings. Write for new J&L Tubular Products handbook.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

Free Enterprise and Oil Conservation

GOVERNOR Robert S. Kerr of Oklahoma, at the annual meeting of the Chamber of Commerce of the United States held recently in Atlantic City, passed on to the nation his appraisal of (a) the free enterprise system that has made America great and (b) the effectiveness of the Interstate Oil Compact Commission which has contributed no little to the orderly processes needed for real development.

"I fully realize that the supplies of many natural resources are limited," he said on a program which evolved around "Our 'Vanishing' Natural Resources," "but America's system of free competitive enterprise has demonstrated the ingenuity, first, to find new reserves; second, to develop improved methods for greater utilization of our known supplies; third, to find substitute materials when needed, and, fourth, through chemical research and advances to develop such a variety of usable materials as to insure acceptable replacements long before exhaustion of any given resource."

Regarding the Interstate Oil Compact, which, incidentally, he heads, Governor Kerr points out that "the compact serves as a forum for the discussion by public officials and private citizens of every phase of conservation, prevention of waste and greater utilization of valued natural resources."

He told how, since the oil compact was founded in 1935, twenty-odd other interstate compacts have been negotiated by two or more states with consent of Congress and how "these interstate compacts and the member states have worked on a cooperative basis with private industry on the one hand and with each other and the federal government on the other."

Besides being born of the necessity for a broader conservation program, and in order that state government may successfully meet their responsibilities in connection therewith, the compacts have also demonstrated that "federal intervention and control of the production of natural resoruces within the states is not necessary, and that the general welfare can be better and more fully served by and through the states themselves," the Governor declared.

Industry Advisory Committee Needed

SIX months ago some petroleum leaders suggested that an industry advisory organization be established as a successor to the Petroleum Industry War Council. Unfortunately, the proposal died because of lack of interest in the industry. Now, there is a need for such an organization.

The need springs from President Truman's recent request that Secretary of Interior Krug undertake the coordination and "unification of federal government policy and administration with respect to the functions and activities relating to petroleum carried on by the various departments and agencies." The President recommended that Krug advise with an industry organization. If an organization representative of all factions in the industry had been established as suggested, Krug could immediately turn to them for advice.

The President's proposal may prove to be of much importance to the industry. Duplicating agencies should be eliminated, and government policies should be corrected and improved wherever possible. Particularly should duties be definitely set out and limitations placed on powers. Government men cannot be expected to accomplish these acts in the best manner without the advice of men familiar with the workings of the industry, nor without representation from all interested factions—which can be supplied only by a carefully selected advisory group.

We have only turned the first few pages of Volume I in the book which will record America's development. . . . Any day that this country starts fearing competition, we will know that the last chapter is about to be written. —Henry J. Kaiser.

Unionization Move Should Be Stopped

AN EFFORT to organize engineers into a union affiliated with the American Federation of Labor deserves to, and it is hoped will, fail.

Activity in the Houston area has been apparent for a couple of months and while the "clincher" meeting failed of its purpose, the proponents challenged a group of registered engineers who opposed unionization with "we'll adjourn, but six months from now, let's compare notes." Incidentally, the president of the Houston local which claims some 25 members, said there are 70 such unions operating in the United States and Canada.

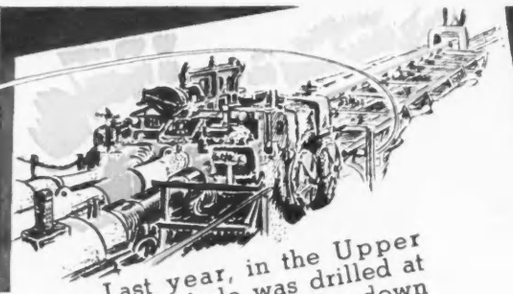
If engineers became members of this or any other union, they, like the hodcarrier or the longshoreman, would have to respect picket lines. That was made plain at the Houston meeting. And, of course, there would be other rules and obligations which they would have to live up to.

Unionization of professional engineers, THE OIL WEEKLY believes, is carrying the idea too far. It is one thing to have the workers, both common and skilled, on a job organized, but it's quite another to have the men who do the creative work and who accept the responsibility for a project to be subject to restrictions which unions too frequently impose upon their members.

As we say, engineers belong to a profession that essentially is creative. Wouldn't it tax even John L. Lewis' brain to devise a chart setting forth how many ideas a unionized engineer could turn out in his 40-hour week? Or how many projects he might inspect and pass judgment on between the daily whistles?

The registered engineers of Houston are to be commended for their aggressive opposition. Real engineers in other sections of the country, we feel sure, will be on the alert and similarly fight this move from the very start.

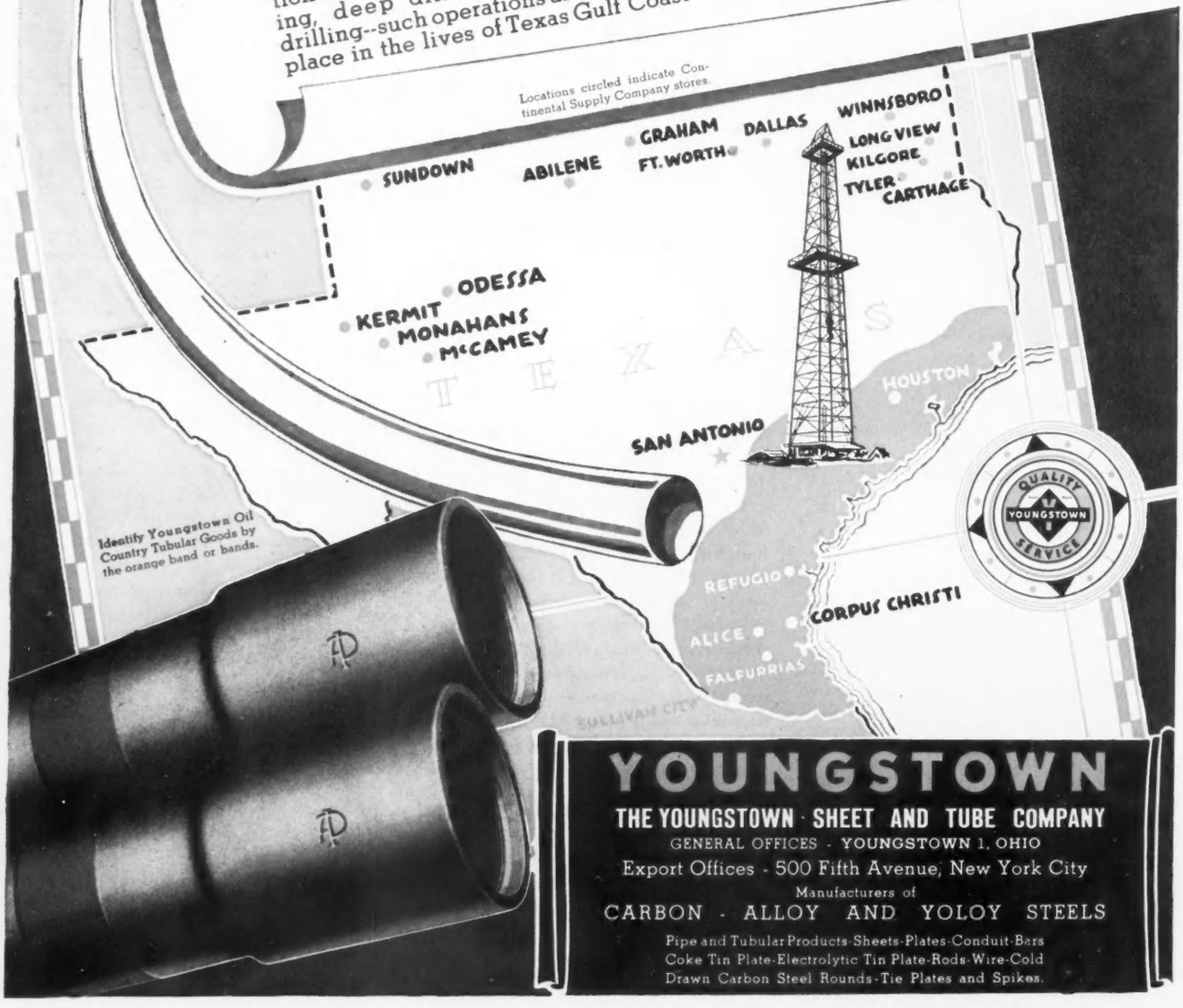
Youngstown to the TEXAS GULF COAST



No region of North America is richer in oil than the Gulf Coast of Texas. There in a broad belt stretching from the Sabine to the Rio Grande, out in the waters of the Gulf itself and over a hundred miles inland, oil men produce nearly a fifth of the country's crude. There, too, is stored an even larger portion of the nation's proven reserves.

To produce this oil calls for unusual ingenuity, hard work, perseverance and high grade equipment in overcoming almost every difficult condition known to oil men. Barge drilling, deep drilling, high pressure drilling--such operations are commonplace in the lives of Texas Gulf Coast oil men. Last year, in the Upper Coastal district a hole was drilled at 815 feet more than three miles down --a new world's record for depth.

When the pioneers struck oil at Spindletop in 1901, Youngstown was just a year old. Throughout the oil history of this great region, Youngstown has supplied a large share of the oil country tubular goods. Operators in the several districts comprising this coastal area have found that Youngstown drill pipe, casing, tubing and line pipe is suitable for their toughest drilling, production and tranportation requirements. Here, as in every other field, the orange bands on pipe are recognized as the sign of quality and dependability.



YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Pipe and Tubular Products-Sheets-Plates-Conduit-Bars
Coke Tin Plate-Electrolytic Tin Plate-Rods-Wire-Cold
Drawn Carbon Steel Rounds-Tie Plates and Spikes.

The Week's News

THE Senate Banking and Currency Committee last week agreed to a one-year extension of OPA and this week will attempt to work out the restrictions which are to be placed upon that agency, but final enactment of the bill may not come until well into June. Meanwhile, OPA officials are waging a last ditch fight to retain their authority to lift controls as they see fit, rather than under any mandatory regulation. Page 27.

Prices Lifted—Increases in the prices of tank trucks, internal combustion engines and electric motors were in sight this week, following OPA action lifting controls from the first and raising ceilings one-sixth or more on the last two items. Story below.

Steel Situation—The steel situation continues to deteriorate while orders pile up. First receipts of coal from captive mines are expected within a few days but it will require three weeks or more for mills to get back on large-scale production. Orders for steel now being filed have little chance of being filled for six months or more. Page 26.

Petroleum Attaches—The House has ordered a cut from 800 to 300 in the State Department foreign service auxiliary, preparatory to its total liquidation in 1947. Unless more generous provision is made by the Senate, the number of petroleum attaches abroad will be a half-dozen instead of a score or more. Story below.

Tidelands Legislation — The tidelands legislation is stranded in the Senate and may lay there indefinitely unless pressure is exerted to bring it to a vote. Members from the interior are disinterested in the measure because of the emphasis placed on California oil. Once brought out into the open, however, it is expected to pass by a comfortable majority. Page 28.

German Findings—Information on German cold-weather lubricants developed after the winter-stalling of the Nazi Russian campaigns is being offered American oil interests by the Commerce Department, and may be of value in connection with the test of equipment to be made by the Army in Alaska next winter.

Panhandle Group Meets—The oil industry must be taken out from under OPA if it is to survive, the Panhandle Producers and Royalty Owners were told last week. Page 28.

Texas Production—Nominations for June oil in Texas exceeded the May figure and the Bureau of Mines estimate. Many refineries claim short supply. Page 29.

Congress May Lop Off Funds Needed To Keep Petroleum Attaches Abroad

An economy-minded Congress, intent on liquidating wartime activities as quickly as possible, is imperiling adequate foreign representation of the oil industry by the State Department.

Instead of more than a score of petroleum attaches in as many foreign countries, the department will be limited to six such officers under the appropriation bill for the fiscal year beginning July 1, already passed by the House and now pending before the Senate Appropriations Committee.

The cut in petroleum attaches is part of an over-all scaling down required by the House, which contemplates reducing the wartime foreign service auxiliary from 800 to 300 for the coming fiscal year and its complete liquidation by June 30, 1947.

Because government entrance salaries do not attract experienced industrialists and appointments cannot be made directly to the higher grades, the department during the war set up the auxiliary, in which men from the oil and other industries were enlisted at fair salaries to assist in the specific problems which arose under wartime conditions. It sought to retain this force for the new problems which the end of the war brought, pending the training of a permanent force.

Oil Knowledge Desirable

There are today many imperative oil problems with which the State Department must deal, involved in the tendency of European governments to nationalize the oil and other important industries, the recovery of American properties seized by the enemy during the war, discriminatory trade barriers, Russian ambitions in Eastern Europe and the Middle East, etc.

Several years may be required to work out many of these problems satisfactorily, and the State Department had planned to make extensive use of the auxiliary foreign service in that program.

Officials explain that many of the problems involving oil do not require the use of men trained in that industry, but can be adequately reported by experienced foreign service officials, but many questions arise from time to time in which a knowledge of the oil industry is highly desirable.

There are a few men in the department in Washington who have had experience in the oil industry, and under a program which is being worked out for the exchange of officers between Washington and the field, some of these men will become available for duty abroad. This will not entirely solve the problem raised by the decision of the House to cut the auxiliary service, and it is hoped that the Senate will permit the retention of more oil posts than the House bill provides for.

The retention of an adequate staff of petroleum attaches was urged upon the department last September by former PAW Administrator Harold L. Ickes, and was given the approval of the PAW foreign operations committee.

In response to a letter from Ickes on the subject, Secretary James F. Byrnes expressed complete agreement that additional capable oil representatives were needed "to guide and assist this government in its relations with foreign nations both as a means of formulating and implementing sound foreign oil policies and of supporting and advancing the legitimate interests of the American petroleum industry abroad."

Byrnes Cites Factors

Byrnes disclosed that the department was developing plans on a global basis for the assignment of petroleum officers in foreign nations or areas, on the basis of such factors as: 1) importance of each country or area as a center of petroleum resources or trade; 2) need for moderation of local laws or regulations restricting American nationals from access on equal terms to the petroleum trade and raw materials of such country or area; 3) restoration of petroleum properties to American national in complete good order and with appropriate compensation for loss or damage incident to military operations; 4) possibility of assisting American interests to obtain new concessions opportunities abroad; 5) orderly disposal of U. S. surplus and Lend-Lease petroleum facilities and equipment; 6) revitalization of local petroleum industry within each friendly foreign nation as a means of rehabilitating any war disrupted internal economy; 7) operations and technologi-

Trucks and Motors Given Price Increase by OPA

New methods are provided for the pricing of new trucks, and controls were entirely removed last week from tank trucks and trucks of 40,000 pounds gross weight or more.

Manufacturers of internal combustion engines and equipment were given an industry-wide increase of 15.5 percent over previous ceiling prices.

Manufacturers of electric motors were allowed a 16.5 percent increase on integral horsepower motors and a 27 percent increase for fractional horsepower motors. However, the latter were given a 9 percent increase last October, which will be counted against the 27 percent.

cal developments of foreign oil industry, and 8) trends in oil policies of foreign governments.

"In the interest of ultimately attaining the petroleum objectives abroad outlined," Byrnes said, "the department has embarked on a program consisting, inter alia, of the following functions: a) ascertain the need for assignment of qualified petroleum officers at each post; b) define duties to be performed by such officer at each post; c) select qualified oil representatives for such assignments; d) prepare appropriate current instructions designed to maximize the usefulness of these officers and to keep them informed regarding developments of U. S. political and economic policies pertaining to petroleum; e) analyze, evaluate, and collate reports from such officers abroad; and f) coordinate related activities of the interested officers and divisions within the department and of other U. S. agencies."

Good Attendance at Texas A. & M. Conference

One hundred and sixty persons from 11 states attended the conference on drilling fluids held last week by the Department of Petroleum Engineering, Texas A. & M. College at College Station. These included representatives from the industry as well as petroleum engineering students. A large number came from drilling contractors working in Texas, Oklahoma and Louisiana.

Ten lectures were given during the first two days by engineers from oil and service companies dealing with many phases of drilling fluids and on the third day an open forum on drilling fluid problem was held.

Harold Vance, head of the Department of Petroleum Engineering, pointed out that this is the last of a series of three such meetings held during the spring. Others covered well logging and reservoir engineering.

Wax Exports Limited

An extremely tight supply situation was reflected last week in an order of the Office of International Trade limiting the life of outstanding export licenses of petroleum and other mineral waxes to two months. All such licenses validated prior to May 16 will be revoked on July 15.

Oil officials explained that the order was designed to protect the home market.

Some waxes are in such short supply that no exports whatever are permitted except for use in food preservation, it was said.

A similar situation exists with respect to residual fuel oil and diesel oil. No locenses at all are being issued for the export of residual and authorizations for diesel oil have a 60-day life.

New Well Report

A new well status report for the East Texas field, ordered by the Texas Railroad Commission, must be filed in Austin by July 1.

Steelmen Pessimistic About Effects Of Miners' Truce; Small Raises Voice

Failure of coal operators and miners to come to terms before the end of the current truce this week may necessitate immediate reimposition of the freight embargo which was instituted May 10 but lifted two days later after the miners agreed to return to work temporarily. At the week-end it was learned that railroad and government officials had agreed that unless there is assurance of continuous operation of the mines from now on new conservation orders will be necessary.

It was pointed out that if the miners again quit May 25 at the expiration of the truce, whatever coal may be above ground will have to be hoarded even if the new interruption lasted only a day or two. Little production could be expected next week because of the holiday which in some areas, at least, will close the mines from Thursday to Monday.

Rail executives also are considering the possibilities that the short supplies of coal which will prevail through the remainder of the year as a result of the production lost may necessitate an embargo on the movement of non-essential shipments before next fall. There is also a definite possibility that coal will have to be rationed with essential industries getting priorities.

Steel production at the week-end was still on the downgrade, with more than 2 million tons of ingot production already lost since April 1, and steelmen were pessimistic over the prospects of the truce in the coal strike turning into a permanent peace.

Industry reports say that the loss of production from the coal strike plus that lost in the steel strike means the elimination from the market this year of more than 10 million tons of steel, and that figure may go to 12 million tons or more before normal operations are resumed.

It is estimated that the industry as a whole now has a backlog of orders calling for about half a year's output, and it was indicated that many orders long on the books will not be filled for four months or more.

Industry spokesmen said the steel mills will not be able to stage the same quick come-back after the coal strike they did after the steel strike, because they must build up supplies of both coal and scrap. Mills are growing concerned over the rapid rate of scrap consumption and fear the coal strike will be followed by another crisis, a scrap shortage of unparalleled severity.

In the first administration comment striking at John L. Lewis, Civilian Production Administrator John D. Small last week called for a six-month holiday from strikes and urged the enactment in that period of legislation adequately protecting the rights of labor, property and the public.

Not only has the national economy been seriously crippled by the coal strike, he said, but a threatened railroad walkout and "many other" strikes are in the immediate offing.

"Our country cannot take it," he declared. "We must have a breathing spell from strikes and from threats of strikes."

Small charged that Lewis has "made a travesty of collective bargaining" and attempts to establish a patterns of discussing no terms until the operators agree to his will sight unseen.

Small's position received little support in Congress, where three members immediately demanded his resignation.

Topics for Mid-Continent API Sessions Announced

The program has been announced for the spring meeting, Mid-Continent district, API division of production, scheduled June 6-7 at the Skirvin Tower Hotel, Oklahoma City. Papers scheduled include:

"Drilling and Coring Methods in Secondary Recovery Operations," R. B. McCloy, Stanolind Oil & Gas Company, Tulsa; "Rates of Penetration in Hard Formation Drilling," J. E. Warren and B. R. Schabarum, Carl B. King Drilling Company, Midland, Texas; "A New and Improved Drilling Mud," H. H. Kaveler, Phillips Petroleum Company, Bartlesville, Okla.; "Pumping Wells with Electric Motors," J. H. Field, Sohio Petroleum Company, Oklahoma City; "International Petroleum Outlook in Relation to Operations in the United States," C. O. Willson, *Oil & Gas Journal*, Tulsa; "Unitization and Gas Injection in the South Burbank Pool," L. L. McWilliams, Phillips Petroleum Company, Bartlesville; "Problems in Unitization," R. M. Williams, Phillips Petroleum Company, Bartlesville; "Case History of the Efficiency of Natural Water Drives (Illinois)," A. W. Baucum, The Texas Company, Tulsa; "Efficiency of Natural Water Drive—Ramsey Pool," M. B. Penn, Mid-Continent Petroleum Company, Tulsa; "Porosity in Limestone and Dolomite Petroleum Reservoirs," W. C. Imbt and S. P. Ellison, Jr., Stanolind Oil & Gas Company, Midland; "Performance of Bodcaw Reservoir, Cotton Valley Field Cycling Project; New Methods of Predicting Gas condensate Reservoir Performance Under Cycling Operations Compared to Field Data," Martin G. Miller and Max R. Lents, Cotton Valley Operators Committee, Cotton Valley, La.; "The Importance of Injected Gas as a Driving Medium in Limestone Reservoirs as Indicated by Recent Gas Injection Experiments and Reservoir Performance History in Typical Limestone Reservoirs," L. E. Elkins, Stanolind Oil & Gas Company, Tulsa; "Experience in Cunningham," Colin Rae, Skelly Oil Company, Tulsa and "Practical Considerations," Lloyd Gray, Gulf Oil Corporation, Tulsa.

Russia and Iran's Oil

Washington officials are increasingly impressed with the relative unimportance of the Russo-Iran deal for oil development in the five northern provinces of Iran, following the receipt of information that American geologists who surveyed the area some years ago found nothing to indicate any great deposit of oil.

Officials now lean to the belief that Russia is less concerned about the oil she may get from Iran than with preventing operations by nationals of other countries in the area immediately adjacent to her own fields in Baku and in obtaining a foothold on the southern shores of the Caspian Sea.

Russia's oil interest now is along the Urals, where she is developing fields to replace the older fields to the west which were worked heavily during the war and now are on the downgrade.

OPA Challenges Industry Statements on Decontrol

Statements by oil men that there has been no necessity for price control since V-J Day were challenged last week by the OPA, which asserted that last winter "the demand for domestic and industrial fuel oils was completely out of balance with the demand for gasoline, and the continued production of gasoline in maximum quantities resulted in serious shortages of other products to the extent that OPA was required to increase fuel oil prices to stimulate their production."

Light fuel oil prices now are approximately 16 percent and industrial fuel oil prices at least 28 percent higher than in 1941, it said in a statement to the Senate Banking and Currency Committee, and warned that "until the demand for all refined products nears a normal balance there is a strong likelihood that inflationary prices will be charged for those products in greatest demand which happen to be the products with the greatest bearing on our cost of living—fuel oils.

"We believe by early summer the demand for gasoline which is now steadily growing will have reached a point near a normal balance with the demand for other petroleum products," the committee was told. "We hope to have a price suspension order for the petroleum industry in effect by early summer. However, the present coal strike has an important bearing on our price suspension program for petroleum. In the event we suspend controls at or near June 30, we deem it highly important that the production, consumer demand, and stocks be closely watched until October of this year, and then, if it appears that the industry will be able to meet public demand for fuel oils for the coming winter at non-inflationary prices, this industry may be exempted from price control."

OPA also attacked industry contentions that crude prices are insufficient to permit normal exploratory and developmental operations, asserting that more exploratory wells were drilled in 1945 than in any previous year and the 1946 activity is running ahead of last year. The present average crude price of $1.33 per barrel is almost 15 percent higher than the April, 1941, average, it said.

Officials took the position that the immediate lifting of price control would cause industrial fuel oil prices to advance nearly 100 percent over the 1941 level, and argued that the gasoline price situation and demand will improve steadily hereafter and if OPA is permitted to decontrol the industry in an orderly way "we can avoid the higher and inflationary prices for residual fuel oil which we feel would occur with decontrol at this time.

"OPA will watch the economy of this industry closely and will lift price ceilings at the earliest moment possible," they promised. "If inflationary price rises are to be escaped, it is important that Congress should not so amend the act as to compel the premature decontrolling of petroleum."

Department of Commerce Announces Foreign Output

Crude production in Western Zenezuela last year totaled 218,538,657 barrels, an increase of 19.3 percent over the 1944 production of 183,199,288 barrels, it was reported last week by the Department of Commerce.

The western part of the country produced 68 percent of the total Venezuelan output but at the end of the year was accounting for only about 60 percent.

Approximately 17 million barrels of the western production was processed locally and 10 million barrels were exported as fuel oil for ships leaving the area. The rest of the crude was exported, much of it through the Panama Canal to Pacific war areas.

The department also reported Mexico's 1945 production, which approximated 41 million barrels, a 5 million-barrel increase over 1944. The 1946 program calls for production of 50 million barrels, out of reserves estimated by Petroleos Mexicanos at 850 million barrels.

Mexico now has 1028 miles of pipe lines with a capacity of 294,000 barrels daily and refining capacity of 167,000 barrels per working day. Approximately 36 million barrels of products were distributed in 1945, 77 percent to the domestic market and 23 percent for export.

Reports stated that a project has been undertaken for the construction of a new pipe line from Poza Rica to Salamanca in the state of Guanajuato and the erection of a new refinery at the latter point. In addition, a gas pipe line with a capacity of 35 million cubic feet daily is to be built from the Poza Rica field to Mexico City.

Pipe Lines Permits Sought By United Gas from FPC

United Gas Pipe Line Company has filed applications with FPC for authority to construct approximately 16.6 miles of 12¾-inch line from its proposed dehydration plant in Calcasieu Parish and its compressor station in Jefferson Davis Parish, Louisiana, to have a capacity of 62 million cubic feet daily; 10.3 miles of 12¾-inch line from the Baxterville gas field to a projected gas scrubber in Marion County, Mississippi, to have a capacity of 51 million cubic feet daily, and 13.6 miles of 10¾-inch line from a proposed dehydration plant in the Gwinville gas field to a proposed check measuring station in west Smith County, Mississippi.

The company has made new contracts with Gulf Refining Company for the purchase of natural gas produced in the Hayes field, where the reserve is estimated at 500 billion cubic feet, and for gas from the Baxterville and Gwinville fields, the former estimated to have a reserve of 171 billion cubic feet and the latter 1177 billion.

The overall cost of the program was placed at $1,545,000.

FPC Changes Rules on No-Contest Applications

New FPC rules will eliminate formal hearings on applications for certificates of public convenience and necessity on which no protests are filed. This will save applicants time and expense and will speed up the handling of such applications.

The commission will continue to publish the usual notices of applications and distribute them to interested state commissions, municipalities and others whose participation in the proceedings may be in the public interest. If no contest is raised, the commission may dispose of applications upon consideration of the evidence filed without further formality.

Gas Companies Required To File New FPC Form

Class A and B natural gas companies must meet another FPC requirement, an order having been issued requiring that all companies having annual gas operating revenues in excess of $250,000 to file Form No. 11 of monthly statement of operating revenues and income. First of the forms must be filed before May 31, and these will give the required information by months for the first four months of the year.

Ohio Line Approved

Construction of 15 miles of 12¾-inch transmission line in Ohio by the Ohio Fuel Gas Company to connect its system with that of Dayton Power and Light Company, to which it will furnish wholesale natural gas service, was authorized last week by FPC. The new facilities, costing $266,000, will give the Dayton company a stabilized mixture of gases at all times.

Senate Likely to Approve Tidelands Measure But Not Before Mid-Summer

The tidelands legislation, approved by the House and given a strong recommendation by the Senate Judiciary Committee, appears stalled on the Senate calendar, with action in the near future probable only if Senator Pat McCarran of Nevada, chairman of the committee, moves to bring it up some quiet day or Senator Tom Connally of Texas returns from the Paris meeting of the Big Four ministers and throws his weight behind it.

Senators from the coastal states have been working on McCarran in an effort to get action on the resolution which would relinquish all federal claim to ownership of the tidelands, but the Nevadan sees a fight ahead of the measure if it is called up for consideration when many senators are present, and appears to be awaiting a quiet day when, with few members in the chamber, it might be rushed through without extensive debate.

Although the delegations from the coastal states are attempting to whip up support for the resolution, some members from the interior appear to believe that it is purely a California matter and one which will not affect their constituencies. It is believed, however, that once the measure comes up it will pass by a substantial majority.

The absence from Washington of Senator Connally has deprived the legislation of important support, but it is expected that when he returns he will immediately plunge into his campaign for re-election and will devote little attention to domestic legislation until after the Texas primaries in July.

A delegation of California oil men has been in Washington for some time, attempting to get action on the measure. They are currently not overly optimistic about the outlook and foresee the possibility that they still may be camping in the capital in mid-summer.

Gulf Publishing Company Holds Annual Meeting

R. P. Swinsky was added to the board of directors of the Gulf Publishing Company at the annual meeting of stockholders held May 6. Other directors re-elected include Ray L. Dudley, Chas. H. Lane, James Anderson, A. L. Burns, T. W. Nelson, Warren L. Baker, William Hudspeth, and P. J. Aucoin.

The directors re-elected all officers as follows: President, Ray L. Dudley; vice president and general manager, A. L. Burns; second vice president, Tom W. Nelson; vice presidents, J. F. Carter, Jr., and R. P. Swinsky; secretary, Warren L. Baker; assistant secretary, L. J. Logan; treasurer, P. J. Aucoin; assistant treasurer, Robert V. Turner.

Gulf Publishing Company publishes THE OIL WEEKLY, the *Petroleum Refiner*, *Composite Catalog* and *Refiner Catalog*.

Recovery of Oil-Field Waste Emulsion Reported

New methods worked out in Bureau of Mines laboratories and tested in a field pilot plant near El Dorado, Ark., permit the salvaging from weathered tank bottom settlings of oil containing as high as 17 percent micro-crystalline wax, the Interior Department has announced.

Demand for high-melting point paraffin has increased steadily because of its extended use in the manufacture of drappers and packages for foodstuffs and tobacco, for lining beverage cans and other containers, impregnating paper milk bottle caps and cartons, and in the manufacture of electrical equipment.

Results of the research, conducted in cooperation with the Kansas Board of Health and two Oklahoma oil companies, are embodied in a report on the "Recovery and Utilization of Oil from Oil-Field Waste Emulsion," copies of which may be had from the bureau without charge.

It is believed that the new methods will result in providing an economical method of dealing with oil-field emulsion which does not respond to conventional demulsifying treatment and heretofore has been wasted.

Phillips Named Head of Texas Panhandle Group

Classifying the OPA as "a bunch of little people with too much power who want to hold power over the legislature," Russell A. Brown, chief counsel for the IPAA told 300 members of the Panhandle Producers and Royalty Owners Association meeting in Amarillo, Texas, last week that the oil industry must be taken out from under the OPA if it is to survive. He praised the efforts of this association and other similar groups over the nation in the fight to save the industry and also declared that it was criminal that "we have given so little consideration to the intrinsic value of our oil and gas."

Natural gas produced in Texas and supplied to less favored communities in other states is the most convenient and satisfactory fuel in the world and should command prices commensurate with other fuels, Fred Shields, president of the Texas Mid-Continent Oil and Gas Association, declared.

Shields deplored the low prices received for natural gas by Texas producers and cited facts that Texas gas sells for less than three cents per thousand feet at the well, while gas produced in Ohio sells for 16.4 cents; Pennsylvania 22.3 cents; New York 24.5 cents.

"I hear talk from the tax eaters that natural gas tax should be increased," said Shields, "but any tax placed on gas today with this low price becomes confiscatory. Adequate prices will bring increased taxed automatically, since the tax is based on price received at the well."

J. R. Phillips, Borger, is the new president of the Panhandle Producers and Royalty Owners Association, succeeding R. C. Kay of Amarillo who has served for two years.

Others officers are Cecil O'Brien, Amarillo, vice president; H. D. Thompson, Amarillo, secretary-treasurer; and Lester Wiles, Borger, assistant secretary-treasurer.

Phillips, O'Brien and Thompson were elevated and Wiles was added to the list of officers.

Col. Lawrence Hagy of Amarillo, just returned from Europe and Asia as a member of the Allied Control Commission, was a guest speaker. He declared "we must protect our oil reserves, not only here but all over the wold."

Problem of Underground War Sites Given Study

Underground sits to be used for refineries, synthetic rubber plants and other vital facilities are being surveyed by the Army and Navy Munitions Board as part of a broad program to lay the groundwork for a national security in the next war.

The War and Navy Department last week explained they have no present intention of recommending that any industries be placed underground, but the primary purpose of the survey is to locate sites suitable for the safe and economical storage of many of the vital items of machine tools and mechanical equipment owned by the government which otherwise would require extensive surface storage facilities and to develop sites in which industries could be located should such action become necessary. Both natural caves and man-made caverns such as mines will be studied.

The board also is working out programs for the simplification and standardization of the problems of industrial mobilization; developing joint service specifications for material and products used by both services, and studying the establishment of industrial facilities for the peacetime army and navy which may serve as a nucleus for operation and expansion in case of any emergency. From the last will come recommendations on legislation required to place War or Navy department or RFC-owned industrial facilities into the active or stand-by categories of the peacetime program and the designation of facilities which should be included in the program under the ownership of the War or Navy departments and the coordination required with civilian industry to supplement the program.

Regents Oppose Pact

Opposition to the Anglo-American oil agreement is voiced in a resolution passed by the regents of the University of Texas which charged that approval of the treaty would decrease the value of university oil and gas properties.

Texas Nominations for June Exceed May Allowable and Bureau Estimate

More oil production in Texas during June was requested by refiners and purchasers at the statewide proration hearing at Austin last week, despite Railroad Commission opinion that current demand for Texas crude in general is being met. Relief for independent refiners seemed more urgent. However, shortages among the major companies were likewise indicated.

Nominations for June totalled 2,439,849 barrels up 87,432 barrels above May, and 389,849 barrels above the Bureau of Mines estimate. Nominations indicated the demand for Gulf Coast crude to be up 11,355 barrels, Southwest Texas up 2902 barrels, East Central Texas up 1013 barrels, East Texas field up 27,621, West Central Texas up 1712, West Texas up 47,862 and North Texas up 2545 barrels. Demand for East Texas (outside) crude was cut 5614 barrels and for the Panhandle 3251 barrels.

Shortages Reported

Eastern States Petroleum Company, Crown Central Petroleum, American Liberty Oil Company, Pan American Producing Company, Republic Oil Refining Company, Sinclair, The Texas Company, McMurray Refining Company, Cities Service Oil Company, Humble Oil & Refining Company, and Cosden Petroleum Corporation all reported shortages of crude. Crown Central said that it would shut down June 1 unless relief is granted. American Liberty was shut down from April 1 until May 7 because of a crude shortage.

Specific requests were made at the hearing for increased allowables for the Hastings, Clear Lake, East Texas, South Houston, League City, Gillock, Dickinson, Willamar and North Withers fields. H. P. Nichols of the East Texas Oil Association objected to an increase for East Texas in view of a 4.51 pounds per square inch decline in weighted bottom-hole pressure for the field during April.

A 90-day order proposal by the Railroad Commission met with opposition. It was supported by the Texas Independent Producers and Royalty Owners Association and others who asked that the allowables for June, July and August be set at 2,100,000 barrels daily.

Jack Porter, president of the association, urged that the oil industry continue its fight against OPA price control. He could not understand that there is such a firm demand for crude products since in many instances they cannot be sold at legal ceiling prices.

Paul McDermott, Sinclair representative, asked that new discovery fields be exempt from shutdowns as one means of increasing production.

Judge Dissents From Texas Court Ruling

A decision last week by the Texas Supreme Court is expected to reduce materially the prospect of a successful attack on any order entered by the Railroad Commission where evidence is included. The decision was handled down in two cases involving the Commission's spacing Rule 37 wherein two small tract owners each were seeking a second well.

Chief Justice James Alexander dissented from the court's majority opinion, declaring against all "bureaucratic tyranny."

New AIME Book on Petroleum Available

The American Institute of Mining and Metallurgical Engineers has issued "Petroleum Development and Technology, 1945," Volume 160, which includes papers and discussions presented before the petroleum division at meetings held in Los Angeles, Houston, New York, and also the petroleum statistical reports covering the year 1944. Copies of the book may be obtained by writing to the Office of the Secretary, 29 West 39th Street, New York 18, N. Y.

Crude Oil Production in the United States

(Estimates compiled by the OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED May 18	May 11
Alabama	1,100	1,100
Arkansas	78,000	77,800
California	863,600	859,400
Colorado	28,000	26,700
Florida	250	250
Illinois	208,200	209,600
Indiana	18,950	19,300
Kansas	261,350	245,300
Kentucky	31,250	31,000
Louisiana	378,200	376,950
North Louisiana	86,750	85,500
South Louisiana	291,450	291,450
Michigan	47,150	46,100
Mississippi	62,150	60,750
Missouri	100	100
Montana	19,800	20,050
Nebraska	750	800
New Mexico	95,750	95,750
New York	13,650	13,950
Ohio	7,950	8,100
Oklahoma	373,400	373,250
Pennsylvania	35,600	36,350
Tennessee	35	35
Texas	2,114,800	2,114,800
Upper Gulf Coast	486,000	486,000
East Texas Field	388,800	388,800
Rest of Eastern Texas	139,600	139,600
Southwest Texas	331,500	331,500
West Texas	521,100	521,100
North Texas	164,800	164,800
Panhandle	83,000	83,000
West Virginia	8,300	8,500
Wyoming	112,500	105,750
Total United States	4,760,835	4,731,685

* Revised to include condensate production.
† Revised.

Total stocks, foreign and domestic, May 11, as reported by the Bureau of Mines were 221,615,000 barrels with a daily average production of 4,719,000 and runs to stills 4,820,000.

Patent Roundup

A Regular Feature of THE OIL WEEKLY

Patents recently issued by the United States Patent Office, Washington, D.C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 10 cents per copy and can be had by addressing the Commissioner of Patents, Washington 25, D.C.

Combined Bailer and Dump

William W. Alkire of Vancouver, Washington, has been granted a patent for a combined bailer and dump (No. 586,612).

The apparatus consists of a tube to be lowered into the well with a valve seated in its lower end. The valve comprises a tubular perforated section with a closed bottom which becomes a stem terminating in a dart blade end depending from the tube. The blade end at the bottom of the well holds the valve stationary while the tube is being lowered relatively and sliding into an interlocking connection. The tube, when lowered sufficiently, fully opens the valve and the stem moves up as the tube reaches bottom to dump water out of the tube.

Mud Logging System

A system for mud logging has been patented (No. 2,400,046) by Fred E. Hummel, Ojai, Calif., and assigned to Shell Development Company of San Francisco.

Drilling fluid is continuously sampled by an apparatus consisting of a closed separator connected to an open drilling fluid return discharge by an inclined conduit. Diluting fluid is injected from a pipe into the conduit concurrently with the sample stream. A pressure control system maintains the diluting fluid jet at constant value and effects delivery of the drilling fluid sample stream to the separator at a constant rate.

Bridging Plug

Patent for a bridging plug (No. 468,461) has been assigned by its inventor, Wendell B. Steward of Houston, to Schlumberger Well Surveying Corporation, Houston.

The device consists of a support adapted to extend vertically in a hole, surmounted by a sleeve of flexible material, with upper and lower sleeve retaining members mounted to slide. An upwardly and inwardly tapered part is secured below the support, and a downwardly and inwardly tapered part movably mounted at the upper end of the support. A number of slips that slide both longitudinally and on a lateral plane are mounted between the tapered parts and the upper and lower sleeve retaining pieces. The support is moved relatively to the upwardly tapered body.

March Imports of Oil Register Slight Decline

Imports of oil and products declined somewhat in March from the level of previous months, but receipts for the first quarter of the year were 35 percent above those of the corresponding period in 1945.

March imports were 9,927,000 barrels, against 11,011,000 barrels in February, of which 6,578,000 barrels was crude against 7,102,000 barrels and 3,349,000 barrels refined products against 3,909,000 barrels, most of the refined imports, 2,772,000 barrels against 3,427,000 barrels, was residual fuel oil.

Of the total imports, 5,797,000 barrels were from Venezuela, against 6,421,000 barrels in February; 3,059,000 barrels from the Netherland West Indies against 3,814,000 barrels; 720,000 barrels from Colombia against 525,000 barrels, and 344,000 barrels from Mexico against 251,000 barrels.

First quarter imports totaled 33,774,000 barrels compared with 24,240,000 barrels in the same period last year. Crude receipts were 21,982,000 barrels against 13,984,000 barrels and refined products 11,762,000 barrels against 10,256,000 barrels.

State Department Watches Plan to Buy Royalty Oil

State Department officials are watching with interest reported plans of an East Coast group to purchase and import Venezuelan and Colombian royalty oil (THE OIL WEEKLY, May 6).

It is known that the Venezuelan government has long been dissatisfied with the price placed upon its oil by the American concessionaire, and conceivably the Colombian government feels the same way. The royalty price is based upon the posted price of certain American crudes of similar grade, but Venezuelan officials are represented as feeling it should be based upon higher grades which they claim are more nearly equal.

Since neither government had any ready way of disposing of royalty oil, they have taken royalty in cash for practically all of the oil coming to them.

Only vague reports have been received at the department from Venezuela regarding the proposal to sell the oil to other than the concessionaires, but it is believed the government should welcome the opportunity to increase its revenue from its oil resources.

Southwest Production Division

API Sessions

Conservation of natural resources, foreign oil and drilling problems included in program at Shreveport

By GORDON B. NICHOLSON, Staff Writer

PAPERS on a wide variety of subjects, ranging from conservation of natural resources and foreign oil development to problems encountered in condensate production and in drilling operations, were presented at the first postwar meeting of the Southwest District of the American Petroleum Institute's Division of Production. The meeting was held in Shreveport, La., last week.

Abstracts of the papers follow:

The American Oil Man and Foreign Oil

By E. DeGOLYER,
DeGolyer and MacNaughton, Dallas.

Development of oil in foreign countries offers American oil companies and individuals in the petroleum industry real opportunity. United States' position as the world's great consumer as well as the world's great producer of oil has developed men skilled in oil field operation and management in addition to creating large aggregates of venture-minded capital managed by executives with experience and understanding of the hazards inherent in oil field operations. With the apparent approach of the domestic industry to a period of lessening opportunity, it is in the national interest that our trained personnel venture abroad.

Large American companies are substantial and succesful foreign operators, but few independents and smaller companies have entered these areas, although there is an increasing tendency in this direction. There is no reason why individuals or small companies, individually or in groups, should not engage in foreign operations.

A study of political conditions and the people of a country should be made before it is entered. The political risk must be wieghed, with consideration given to stability of the government, economic conditions, legal concepts, and tendencies toward nationalization. Alliances, foreign alignments, and outside pressures must be considered, as well as the people of the country and their institutions.

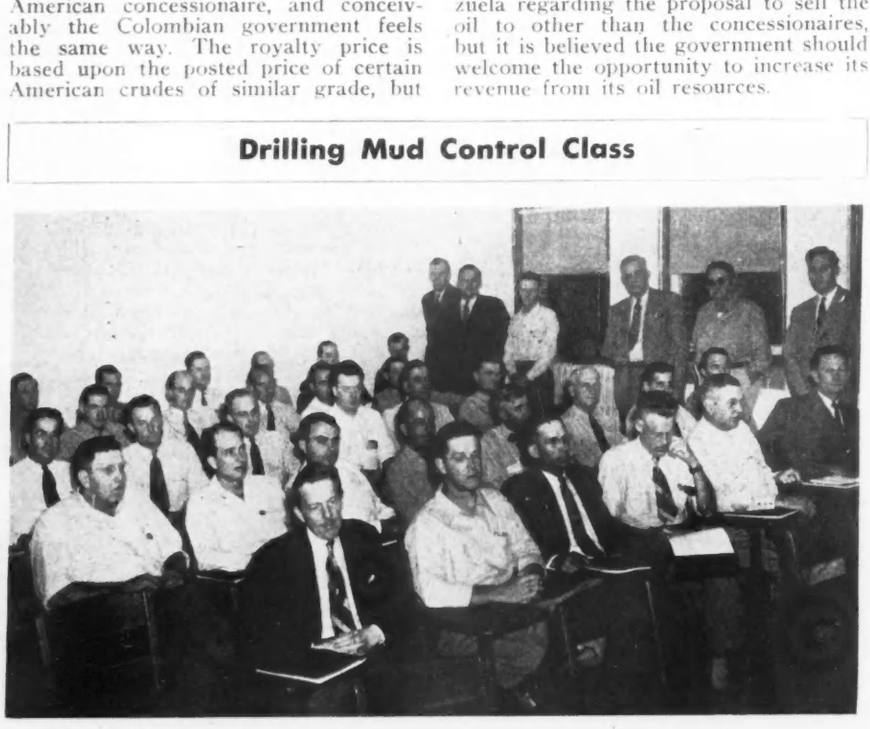
Different Procedures

Land tenure involving ownership of the subsurface or mineral rights by the owner of the surface, familiar in American oil circles, exists in very few areas outside the United States. In most foreign countries, the subsoil pertains in some form to the state, and the taking of leases or concessions under such conditions is generally by either of two distinct procedures, the least desirable occurring in nations which have no mining or petroleum laws, in which case grants of oil rights are negotiated with government heads and raitfied by its legislative bodies. The other type of procedure, in nations having adequate mining and petroleum laws, involves grants of adequate size through some fixed and limited procedure.

An American entering a foreign country goes on a parity with the nationals of that country, and his redress for any injustice is through the courts of the country, with little opportunity to ask for diplomatic protection.

In general, operations in foreign lands are subject to difficulties inconceivable to the average independent operating in the United States, particularly in exploratory operations, and all projects are subject to long delays and expense. While preliminary exploration should be conducted by American personnel, it is desirable that nationals of the country

Drilling Mud Control Class



The North Texas Oil & Gas Association is sponsoring a short course on drilling mud control at Hardin Junior College, Wichita Falls. Topics to be covered in the five-weeks course include functions of drilling mud, field testing, conditioning, calculations and a practical mud program for the North Texas area. Pictured above is the first class of 80 enrollees from the drilling branch of the petroleum industry in North Texas. John W. Woodruff, state coordinator, Petroleum Industry Training, and H. D. Beardin, district supervisor of Trade and Industrial Training, have developed the program.

be trained to replace American crews in every job possible.

Foreign oil is not generally regarded so favorably as bank collateral as is domestic production. Also, through money-export restrictions, it is at times difficult to move money back into the United States.

Operations in a foreign field present an operator with a wide economic opportunity, but are also important to the nation and also to the nationals of the country in which operations are conducted. For foreign development to prosper, it must be of definite and tangible benefit to the people in which it occurs —not only to the nation, but to the people individually.

Conservation of Oil and Gas Resources in Louisiana

By JOSEPH L. McHUGH, Commissioner, Louisiana Department of Conservation, Baton Rouge, La.

Louisiana is recognized nationally for its progressive oil and gas conservation practices, with considerable credit attributed to legislation which makes it profitable for operators to develop and accept these practices. In addition, the sound research conducted by technical groups, especially the API, has been of great assistance.

The increasing importance of obtaining data on gas reserves justifies the effort in determining presently available reserves, and also probable future reserves. Ways and means of producing gas to meet requirements of good conservation must be found in order to get the liquid which is at present the most valuable product of gas-condensate reservoirs. Cycling is one answer, and although many operators have adopted this method, many other operators have not yet utilized it. In fields where cycling is not practical, thought should be given to the installation of gasoline extraction plants as an incenitve for land owners and royalty owners to pool and unitize gas-condensate reservoirs.

Louisiana operators utilized 52 percent of all casinghead gas produced in 1945, and in the very near future the figure will be elevated to 80 percent. Operators who utilize casinghead gas should be given some incentive for continuing and broadening such programs.

America is indebted to the oil industry for technical contributions which enabled maintenance of petroleum reserves and establishment of high levels in the yield of products from crude petroleum and natural gas. The accelerated pace of technical advances have brought the world to the threshold of many new and wonderful developments.

Although scientific discoveries have placed the nation in a dominant world position and opened many possibilities, more thought must be directed toward utilizing these things to benefit the world in social, moral, and spiritual implication rather than from a purely material way.

Problems Encountered in Drilling Abnormal Pressure Formations

By GEORGE E. CANNON and R. S. SULLINS, Humble Oil & Refining Company, Houston.

Data presented from a study of 100 wells drilled in high-pressure zones in the Texas and Louisiana Gulf Coast show that maximum pressures may be first encountered at 7000 feet and that mud weight may have to be gradually increased to a maximum value at 10,000 feet. The pressure gradient indicates that 17.3 pound-per-gallon mud will balance the maximum expected pressure, although mud weighing 18 pounds per gallon or more may have to be used as a safety factor.

As high-pressure zones are approached and heavier muds are used to counteract the formation pressures, the chances of lost returns are increased as the necessary mud weight approaches the overburden weight. Many wells have been abandoned before reaching the desired depth because of the extremely close balance frequently required between back flow and lost returns. Several possible solutions are suggested for prevention of lost returns at critical depths, including the following: 1. Setting of very deep additional strings of casing; 2. Use of sealing agents, such as cane pulp and chopped cellophane, when penetrating extremely porous formations such as gravel beds; 3. Cementing zones of local weakness where heavy muds are employed, provided that the exact position for placing the cement may be determined; and 4. A careful control of the circulating ratio, including careful control of the mud weight.

Mud weighing slightly in excess of 18 pounds per gallon is sufficient to control pressures encountered in Texas and Louisiana. This weight is obtained by using barites and iron oxide weighting materials. For weights as high as 22 pounds per gallon, a ferro-phosphate compound is available. However, such high mud weights are determinetal to maintaining circulation in most wells. When formations are encountered which produce considerable mud, the excess mud is often discarded from the slush pit. A centrifugal concentrator may be used to separate the heavy weighting materials from the clay before the clay is discarded, and often results in saving three to five tons of weighting materials daily.

Viscosity control in high-weight muds is more complicated and expensive than where normal mud weights are employed. Some of the viscosity reducing agents, such as the complex phosphates, are unstable at the high temperatures encountered, viscosity reduction obtained with alkaline-tannate solutions being more stable under such conditions. Difficulties in treating to reduce viscosity are often caused by presence of salt water. Use of a centrifugal concentrator for removing soluble salts from drilling mud has proved satisfactory. Removal of clays which enter the mud from the formation is also effected by the concentrator as an aid to maintaining desired viscosity.

The difficulty in maintaining desired rates of circulation when high mud weights are employed receives compensation by the reduced slippage which occurs in muds of high density and high viscosity. Thus, the mud velocity needed to remove cuttings is reduced in proportion to the increase in mud weight and viscosity.

Twenty More Pools Given Stripper Field Subsidies

Twenty pools in eight states, accounting for one-fifth of one percent of the national crude oil production, have been placed on the stripper-well subsidy list, effective as from April 1, OPA announced.

Seven of the pools had previously been granted subsidies but have since qualified for higher payments. The 20 pools are (* indicates previously on list):

Indiana: Hortonsville, 35 cents per barrel.

Illinois: Alma, 25 cents; Inman West, 20 cents; Maunie South,* 5 cents; Storms,* 5 cents.

Kansas: Lorraine, 20 cents; Rainbow Bend West, 20 cents; Ritz Canton, 5 cents; Seacat, 20 cents; Laton,* 5 cents.

Michigan: Crystal, 25 cents.

New Mexico: Robinson, 35 cents; Getty,* 17 cents; Penrose-Skelly* (except Clear Fork), 5 cents.

Oklahoma: Fitts* (Gilcrease, Cromwell, Hunton lime and Simpson series), 5 cents; Loco,* 10 cents.

Texas: McCamey, 6 cents; Roark-Nail, 20 cents; Sewell, 20 cents.

California: La Habra, 35 cents.

The Variable Volume Equilibrium Cell and Its Application to the Study of Condensate Problems

By J. PAUL SLOAN, Gulf Oil Corporation, Houston.

The increasing volume of condensate production has brought into focus the necessity for more extensive knowledge of the behavior of the hydrocarbon mixtures from these reservoirs and how to more efficiently produce them. Reservoirs are classed as undersaturated, saturated, and the two phase type. Loss of heavy hydrocarbons by retrograde condensation in the reservoir is a primary consideration, and a primary question is the magnitude and quality of this loss of normally liquid hydrocarbons. The answer is best found by reproducing the reservoir conditions and hydrocarbon composition in the laboratory, where the mixture may be manipulated and its behavior studied.

Equipment developed for study of this type includes the blind cell, a hot wire technique, and a fixed volume cell, all of which have disadvantages. An attempt to combine all their desirable features resulted in the design of the equilibruim cell containing four chambers, the upper one equipped with a floating piston for varying the volume; a mixing motor, and an observation chamber with windows for visual reference. Simulation of changing reservoir conditions is attained with the device, with accurate volumetric, temperature, and pressure controls.

The data resulting from a test of reservoir samples furnish a quick means of determining the condensation and volumetric behavior of a hydrocarbon mixture. The values obtained are accurate in the determination for the reason that the weight of the charge is fixed and that no error exists in liquid volumetric measurement due to wet cell walls.

The advantages of the variable volume cell equipped with a viewing window are summarized as follows: (1) Serves all the purposes served by the blind cell for the determination of Pressure-Volume-Temperature data, and the re-combination of samples for analytical purposes; (2) Provides fisibility of phase results, enabling accurate measurement of small volumes and determination of the dew point pressure; (3) Enables the analyst to make a wide range of phase determinations on a sample, with the assurance that all determinations are relative to each other; (4) While accomplishing the above purposes, the amount of sample under study is sufficiently large to allow extensive analytical data of the gas phase hydrocarbons under conditions of reser-

voir depletion; and (5) The determination of the liquid phase volume of a constant weight of re-combined well effluent on the forward pressure traverse serves as a guide as well as an upper limit on the measurement of the accumulating retrograde liquid volume.

Use of Oil Base Mud at Elk Hills Naval Petroleum Reserve No. 1

By E. W. STUART, Stanolind Oil and Gas Company, Tulsa.

During the wartime development of Elk Hills Naval Petroleum Reserve No. 1 a program was initiated for obtaining comprehensive reservoir data including sand thickness, porosity, permeability, and fluid content. Representative wells were selected and the faults and the multiple-producing sands necessitated coring a large number of wells.

Coring of 50 wells with natural water mud resulted in erratic analysis data which indicated a large amount of flushing from the mud. Due to this undesirable flushing, low fluid loss starch muds were used on 30 wells, the resulting analyses showing more than the permissible amount of flushing. Then approximately 15 wells were cored through the producing sands with oil base mud and excellent core recovery was experienced.

Use of oil base mud requires special handling to minimize expensive mud losses, prevent water entrainment, insure rig cleanliness, and guard against fire. Additional equipment at the rig included storage tanks for the mud, steel mud pits, larger mesh shale shaker screens, steel pipe racks with adequate drian, neoprene pump parts and pipe wipers, and neoprene-lined mud hoses.

Cores were carefully cut with a conventional barrel in oil base mud and were analyzed without delay by two methods of analysis to determine the permeability, porosity, water, oil and salinity. Comparison showed that the accuracy of the analysis was good. The two sets of data show considerable variation, but the trends are in the same direction and the average of the data is close. A similar comparison of these data with a well cored with a water base mud shows considerable flushing and much lower salinity, the results indicating that use of oil base mud for core analysis gives a close picture of reservoir saturations and salinities, but does not especially benefit porosity and permeability determination.

Completions of wells with oil base muds was simple and satisfactory in most cases, the wells flowing pipe line oil immediately upon completion, in contrast with the swabbing and bailing necessary in the case of natural muds. Wells drilled with oil base mud showed greater initial production and a higher productivity index, even in the one instance where bottom hole pressure is higher in the well drilled with natural mud. Insufficient data has been collected in this field to conclude that these initial increases will be sustained over the life of the well.

An Investigation of Oil Well Cementing

By A. J. TEPLITZ, Gulf Research and Development Company, Pittsburgh, Pa., and W. E. Hassebroek, Halliburton Oil Well Cementing Company, Duncan, Okla.

Faced with an increasing number of cementing failures in a region where most of the drilling is conducted from barges over water, and operating costs therefore high, it was decided to make a thorough study of the physical processes occurring during the cementation of casing. Various types of well logging services, such as electrical, caliper, temperature and radioactivity surveys were employed freely. Carnotite was used as a tracer in the cement, and complete chronological logs were kept along with other pertinent data.

While the influences of a number of variables have not been ascertained as yet, investigation has indicated that considerable value may be derived from a methodical effort to obtain information on the physical processes occurring during cementing operation with the aid of logging instruments of all types. Also shown was that extensive channeling of cement occurs in the ordinary procedure of casing cementation, and that this is responsible for most failures.

One experiment with a variation in cementing procedure promises good results. By properly equipping the casing with scratchers and centralizing devices, reciprocating the pipe while placing the cement, and speeding up the rate of pumping, it was possible to practically eliminate channeling and thus indicate the possibility of greatly increasing the proportion of successful casing settings.

Some valuable information on squeeze cementing also was obtained. It appears that in some cases, squeeze cementing may be harmful to producing formations, but it is believed further study of this type of cementing will aid in reducing hazards.

Corrosion of High Pressure Production Equipment

By FRANK S. WEST, West & Cole, Houston.

Corrosion of high-pressure distillate well equipment is a comparatively new phase of an old problem. Technical organizations have been joined by the Bureau of Mines and research departments of producing companies in conducting a research program resulting in increased knowledge of the subject although the practical answers are far from ready.

More than two thirds of all the present producing distillate fields are corrosive, with a large percentage of these fields "seriously corrosive" and requiring annual replacement of tubing strings, tree fittings, or flow lines. Most corrosion occurs in the tubing and is generally greatest near the surface of the well, but it is now known that corrosion extends over the entire length of the tubing strings, down to depths of 10,000 feet or more. Serious corrosion occurs in the tree fittings, especially in pipe nipples, metallic ring gaskets, valves and chokes. Flow lines have had to be replaced due to corrosion.

Recently, almost all oil companies have inspected the tree fittings, chokes, flow lines, and in many cases the tubing, of the producing wells in distillate fields, most inspections being performed visually except on tubing. A method of inspecting the inside of tubing without killing a well has been developed, by the use of an internal tubing caliper which is inserted into the tubing through the well head when under well head pressure.

Corrosion presents a continual hazard which may cost the petroleum industry millions of dollars before proper relief is obtained. The API Subcommittee on Corrosion of High-Pressure Production Equipment is seeking to obtain all available data on the extent of corrosion in the various distillate fields, its effect on well materials, preventive measures being taken by producing companies, costs attached to such measures, etc. It is believed that such data, especially that in connection with specific means of combatting corrosion and the economics attached thereto, will be of real value.

The Design and Construction of Compressor Plants

By PAUL D. TORREY, Houston.

In a majority of fields where gas is being introduced into the producing formation to stimulate the production of oil, there is no source of high-pressure gas occurring in a natural reservoir which may be used. Often, the proximity of a transmission line makes available gas in pressure and volume desired. However, in course of time some form of compression plant will be required almost inevitably for the cycling of produced gas and for the manufacture of casinghead gasoline. Since economy in initial investment and operating expense over the considerable period during which repressuring is effective controls directly the profit which may be anticipated, elaborate plants are not common in secondary recovery work.

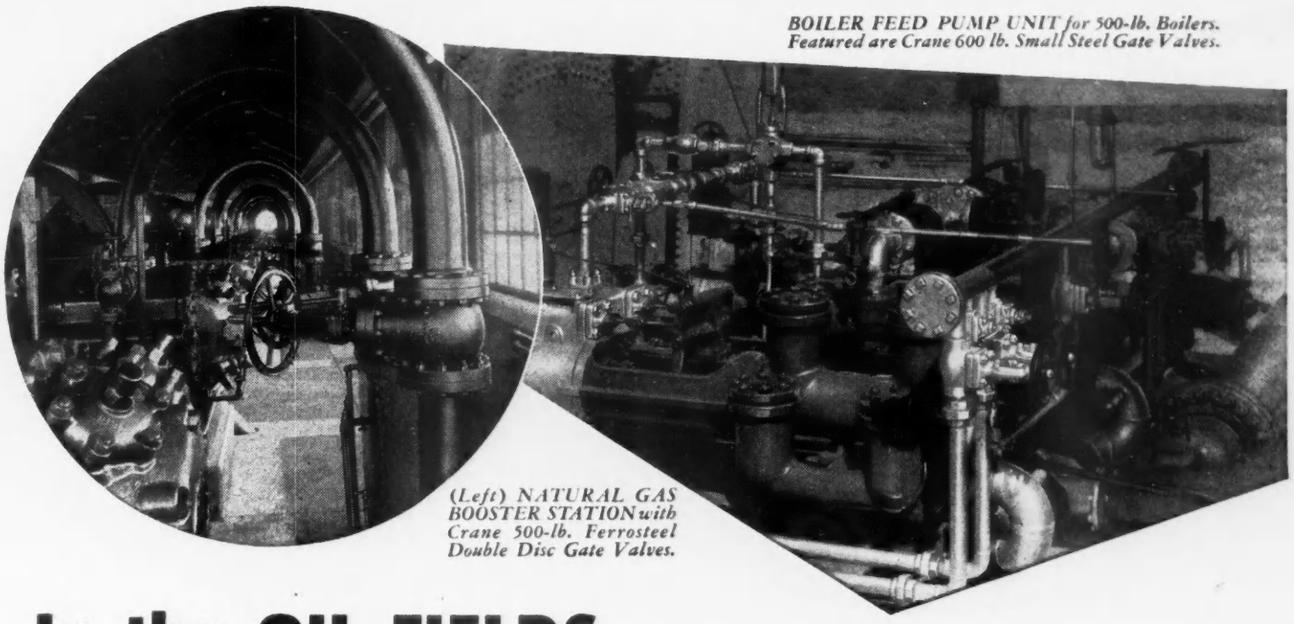
Preliminary tests, under competent engineering supervision, are essential for the selection of compressor facilities having adequate capacity for the repressuring program. Lack of sufficient natural gas may require the use of air for repressuring which will result in operating problems as well as produce hazards from possible explosions.

Compressors commonly used in repressuring operations are of the reciprocating type and are double acting. Formulae are presented for determining brake horsepower requirements and for the volumetric displacement of the compressor cylinder. Close control of engine fuel is needed, and consideration of the compressibility factor is important. Average momentary flow rate for a compressor cylinder must be determined, with adequate pipe connections provided for intake and discharge.

An efficient cooling system is essential for low cost compressor operation, with specifications for quality of cooling water being presented. Poor cooling water will result in deposition of scale or in corrosion, or both. Film inhibitors are receiving increased attention for scale formation and corrosion, and growth of microorganisms is controlled by chemical treatment. Various alkaline compounds used for water treatment may have a detrimental effect on the wood used in the construction of cooling towers.

Removal of dust from both air and gas in areas where dust storms prevail will reduce wear on moving parts in both the engine and compressor cylinders. Cooling and filtration of lubricating oil preserves it in good condition for months of continuous service. Safety devices to prevent overheating and to protect against explosions are necessary equipment for compressor plants used in air and gas repressuring operations.

The design and construction of compressor plants is described in detail, including the plant layout, foundations, basement, and grouting, with constant attention given to factors which add to long range efficiency and economy. Cooperation with the compressor manufacturer is desirable in the design of the layout, and the convenience of a basement usually justifies the additional cost.



BOILER FEED PUMP UNIT for 500-lb. Boilers. Featured are Crane 600 lb. Small Steel Gate Valves.

(Left) NATURAL GAS BOOSTER STATION with Crane 500-lb. Ferrosteel Double Disc Gate Valves.

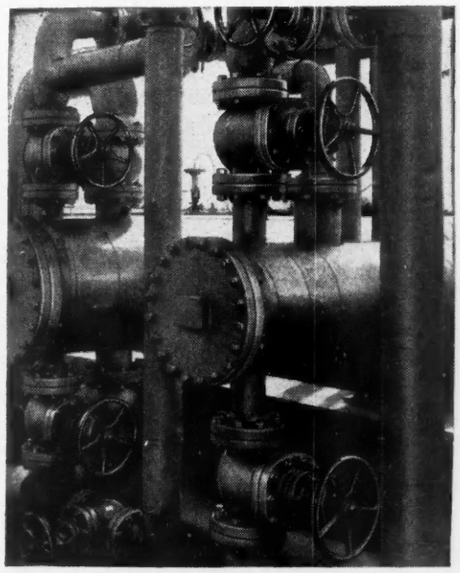
In the OIL FIELDS . . . It's CRANE for Piping Materials

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

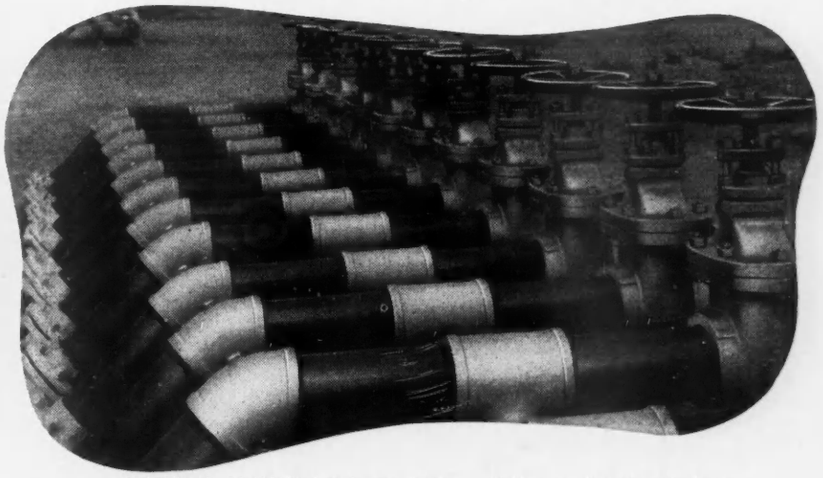
Depend on Crane—the best known name in oil fields! It's the efficient way to take care of piping equipment needs. From this single source—the world's greatest line of brass, iron and steel materials—you can get everything for the job—valves, fittings, pipe, accessories and fabricated piping.

Think of what this means to your entire piping procedure! With only one order to your Crane Branch or Wholesaler, all needs can be met—saving time and trouble. You'll have uniform Crane quality throughout the piping system, with undivided responsibility. And, lastly, you'll be assured of installations that operate at peak efficiency longer, at lower cost.

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas



HEAT EXCHANGER BANK in a Recycling and Reprocessing Plant, showing Crane 250-lb. Ferrosteel Wedge Gate Valves.



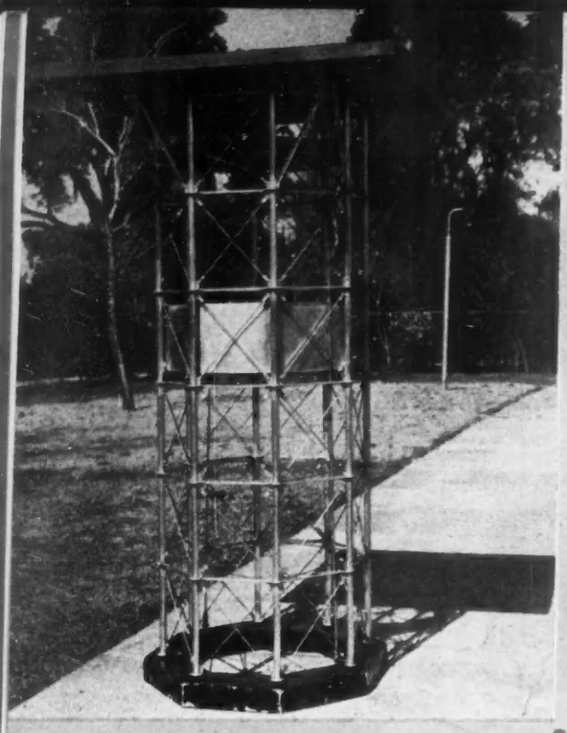
CENTRAL MANIFOLD in Tank Farm Piping, equipped with Crane Fittings and Crane Standard Iron Body Double Disc Gate Valves.

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

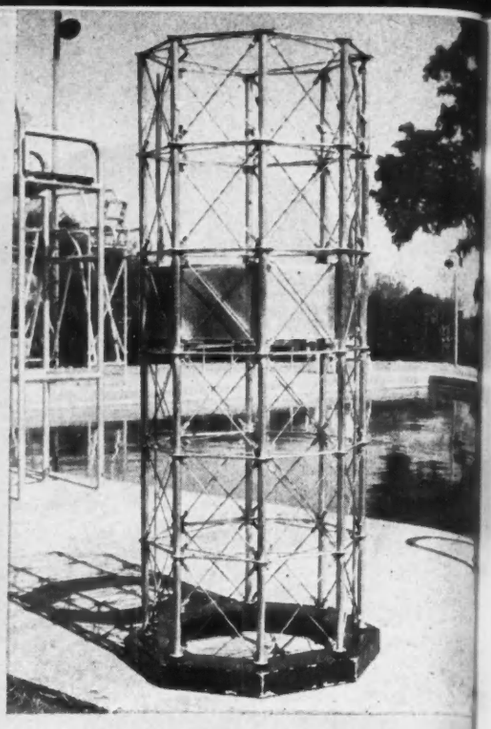
CRANE

FOR EVERY PIPING SYSTEM



Left: The six-section model is a small-scale replica of a marine drilling tower for conducting operations in water 115 feet deep. The complete tower is assembled on shore and towed to the drilling site. The drilling platform on top is added after the tower is sunk, and is 100 feet square. Position of the platform is proposed to be 50 feet above mean water level. A smaller platform is located 25 feet lower on the structure as a floor for auxiliary equipment and for mounting Christmas trees. The model is 6½ feet tall, 30 inches in diameter, and weighs 51 pounds.

Right: Assembly of the tower on shore reduces construction difficulties which would be encountered at drilling locations. Base of tower is an octagonal doughnut containing several air compartments which are flooded by manipulation of surface controls to sink the structure prior to drilling. Additional buoyancy is given by a second air chamber which extends around the circumference of the tower at an upper level. This tank is also provided with facilities for flooding. Each vertical section of the model tower represents 25 feet.



Drilling Tower FOR CONTINENTAL SHELF USE

By GORDON B. NICHOLSON, Staff Writer

THE model of a drilling tower designed to support a rig and attendant equipment for off-shore drilling in deep waters has been displayed by its inventor to interested representatives of the petroleum industry. Featuring a combination of strength and buoyancy, the model is a small-scale replica of contemplated larger structures adequate for marine drilling. Its performance in a swimming pool as part of a demonstration is regarded by its designer as indicative of future actions in the Gulf of Mexico and the oceans overlying the continental shelf in waters exceeding 200 feet in depth.

It is the belief of the inventor that the drilling tower will withstand the severest tests of high winds, heavy seas, or hurricanes due to its tubular construction augmented by reinforcements of heavy vertical and horizontal bracing which offers the least possible resistance. The center of gravity of the tower is located near its base when submerged, usually far-removed from surface agitation, and with width of the base, aided by eight anchor cables adjustable at the points of maximum stress, stabilize the structure. The derrick floor, elevated 50 feet above mean water level, is considered beyond reach of the waves under the most extreme conditions.

It is proposed to build the structure by joining several identical vertical sections of approximately 25 feet each to provide a tower of the height desired for a particular drilling site, with all assembly work being performed on shore. The entire tower is then towed or carried by barge to the location. For drilling where depths exceed 50 feet, the tower floats in horizontal position when being towed, but for shallower depths, a three-section tower is floated upright while resting on its broad and buoyant base, requiring only 36 inches of water.

Controlled Flooding

A system of valves permits flooding the individual air compartments in the base which is shaped like an octagonal doughnut, and brings the structure into vertical position over the location for the well. By continued controlled flooding of the compartments, buoyancy is lost, and the tower settles toward bottom. Ebbing and flowing action of the water is expected to contribute toward "digging in" under the dead-weight of the tower, with the bottom surface of the base being provided with sharp cutting edges to facilitate the process. Also as an expediting factor and to remove high sides to allow leveling the tower, jets are located under the base, and controls at the surface make possible the employment of one or any combination of jets to wash out the sea-bottom sediment to permit adjusting the base for solid support, and to remove high sides which hamper setting the tower upright.

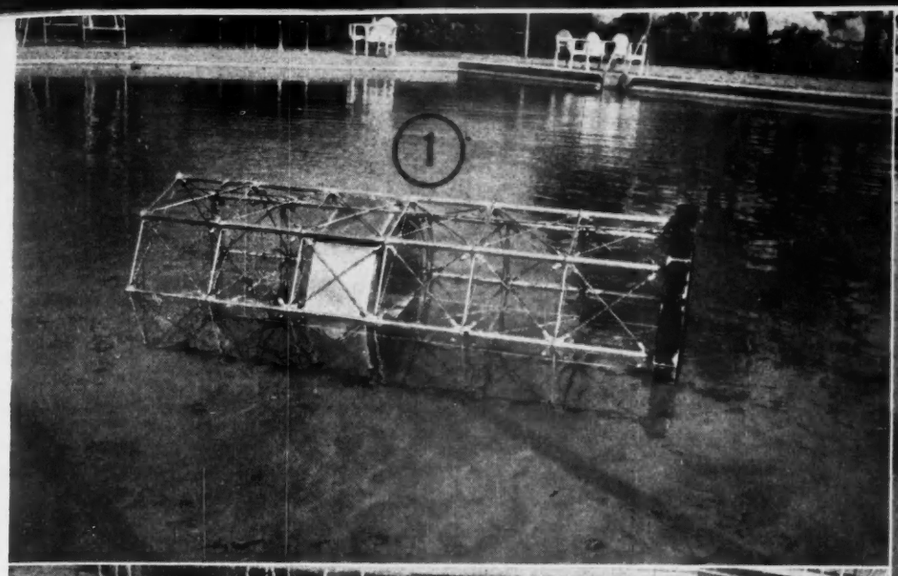
For additional stability and also as an aid to obtaining verticality, from the top of each of the eight columns comprising essential elements in the tower structure is attached a cable bearing an anchor which is deposited in the water at an appropriate distance from the tower. Mechanical winches control tension on the anchor cables, and by their manipulation, the tower is adjusted.

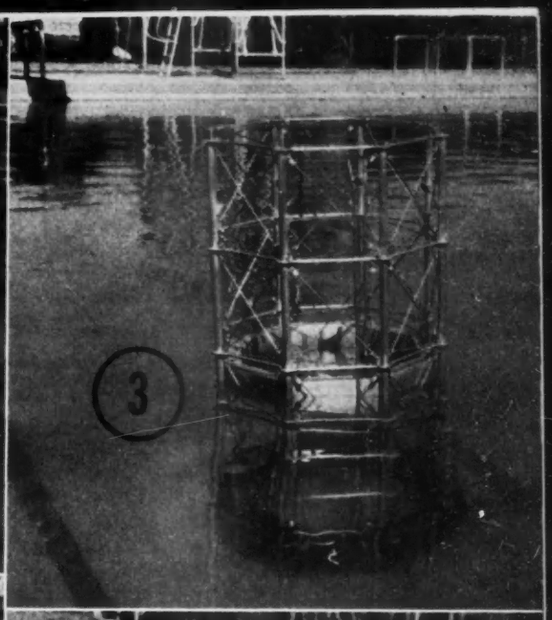
After the marine tower is sunk and proper position established, a platform 100 feet square is constructed on top for mounting drilling equipment, with a smaller platform located 25 feet below for auxiliary apparatus and for placing the Christmas trees upon completion of wells. By drilling the first well in the exact center of the platform, space for drilling eight directional wells in the corners of the octagonal tower allows a maximum of nine wells from each tower, all within the confines of the supporting columns.

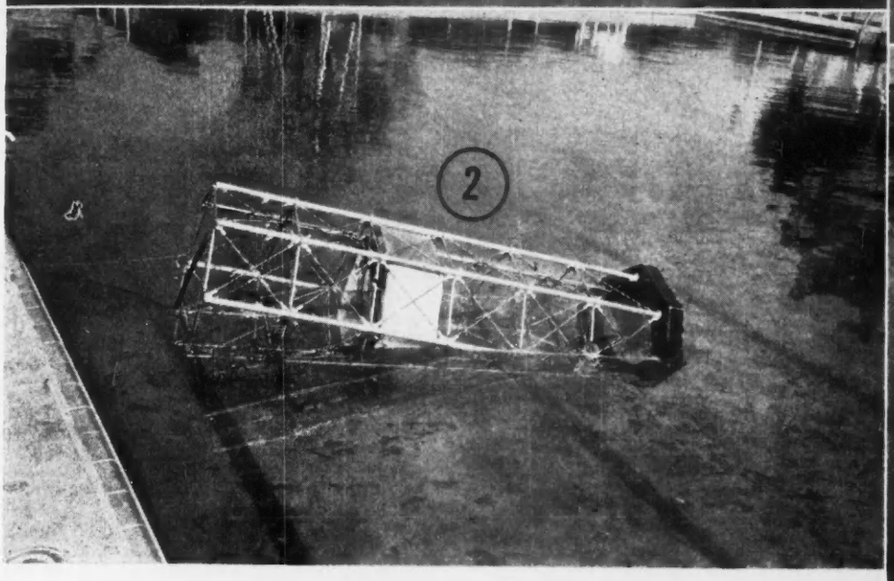
Raising the Tower

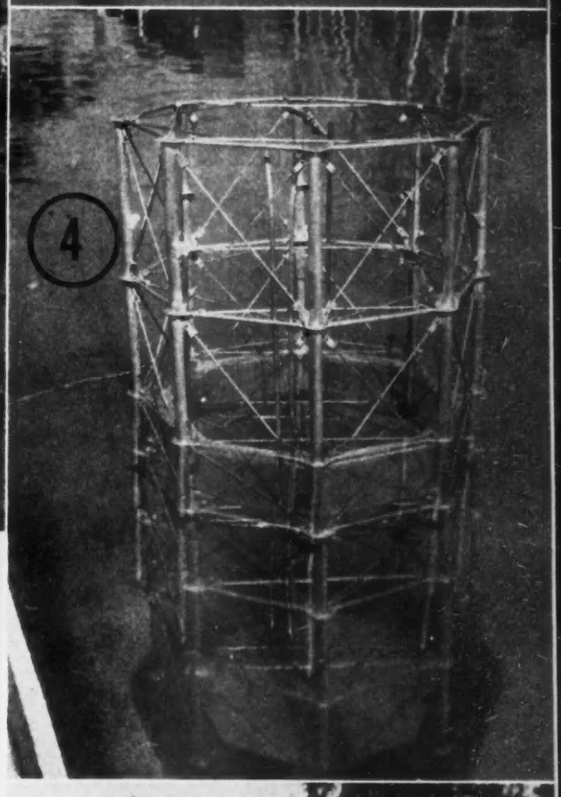
Designed as a permanent structure to accommodate producing multiple wells, the tower is completely salvageable in the event of a dry hole by reversing the flooding procedure. By pumping out water contained in the flooding compartments of the base and by renewal of the jetting action underneath, the structure is floated from its anchorage and removed to another location.

As a feature contributing to the permanence of the tower after completion of wells, provisions are made for replacing the columns while the structure is in use. With most of the corrosion occurring near the water line, any of the eight columns in the section of water contact may be removed without materially weakening the tower. By replacing each pipe singly in this manner, all columns in the critical corrosion zone are supplanted.









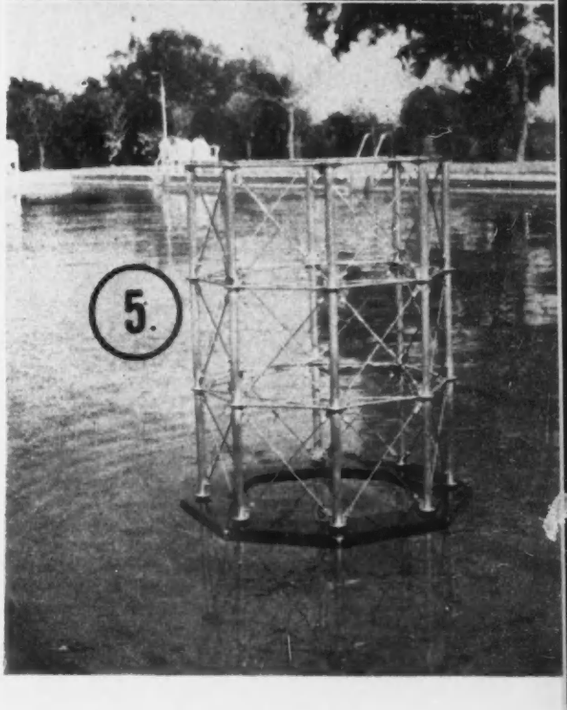
1. The assembled tower is transported by barge to the location and transferred into the water, or is floated from shore in horizontal position and towed, requiring about 27 feet of water for the latter method. The tower employs a sturdy design calculated to withstand heavy seas and hurricanes, with its normal tubular construction offering the least resistance to winds and water. Additional strength is received by the vertical and horizontal bracing which resists distortion in all directions.

2. When in position directly over the proposed well location, valves are opened to flood the compartments in the base. Losing its inherent buoyancy, the base begins to settle in the water, simultaneously tending to elevate the lighter opposite end of the structure. The air reservoir located higher on the tower is not flooded at this stage, insuring buoyancy of the upper sections. Additional buoyancy is afforded by the vertical columns, which are permanently sealed off during fabrication.

3. With continued flooding of the air reservoirs, the base finally sinks, raising the upper end of structure and adopting an upright attitude, aided by the buoyancy of the upper sections. While in this stage of submergence, position of the tower is adjusted directly over the site selected for its final location, and anchor cables are extended from the tops of the vertical columns. Eight anchors are placed on the bottom, dispersed as far as practical, with mechanical winches located at the top of each column to enable making corrections on tension. The anchors enhance the natural stability of the structure, and adjustment of the tension facilitates erecting the tower in upright position.

4. After position of the tower is corrected, floor valves in the upper control reservoir are slowly opened, allowing the structure to sink to bottom. Motion of the waves and the normal ebb and flow of the water combine to "dig in" for a seat. To facilitate this process, however, sharp cutting edges are provided on the bottom surface of the base. In addition, numerous jets are installed on the under-surface, and are arranged to permit use of one or any combination of jets to wash away high sides or remove other impediments to leveling. Adjustment of anchor cables also contributes to properly positioning the tower in the event that the ocean floor is not level. Provisions are made for reversing the sinking procedure by displacing water with air in the event of a dry hole, restoring buoyancy to re-float the tower for transfer to other locations.

5. For drilling in very shallow water, a base and only one section is used, with additional sections required as the depth of water increases. When three or fewer vertical sections are used, or in waters less than 50 feet deep, the tower is floated upright on its base for towing to the drilling site. A tower of three sections requires only approximately 36 inches of water for floating. When location is reached, the base is flooded similarly to the higher towers, and the structure sinks vertically until the base rests on bottom. Additional sections are used for deeper water, maximum depths restricted only by design limitations of the tower.



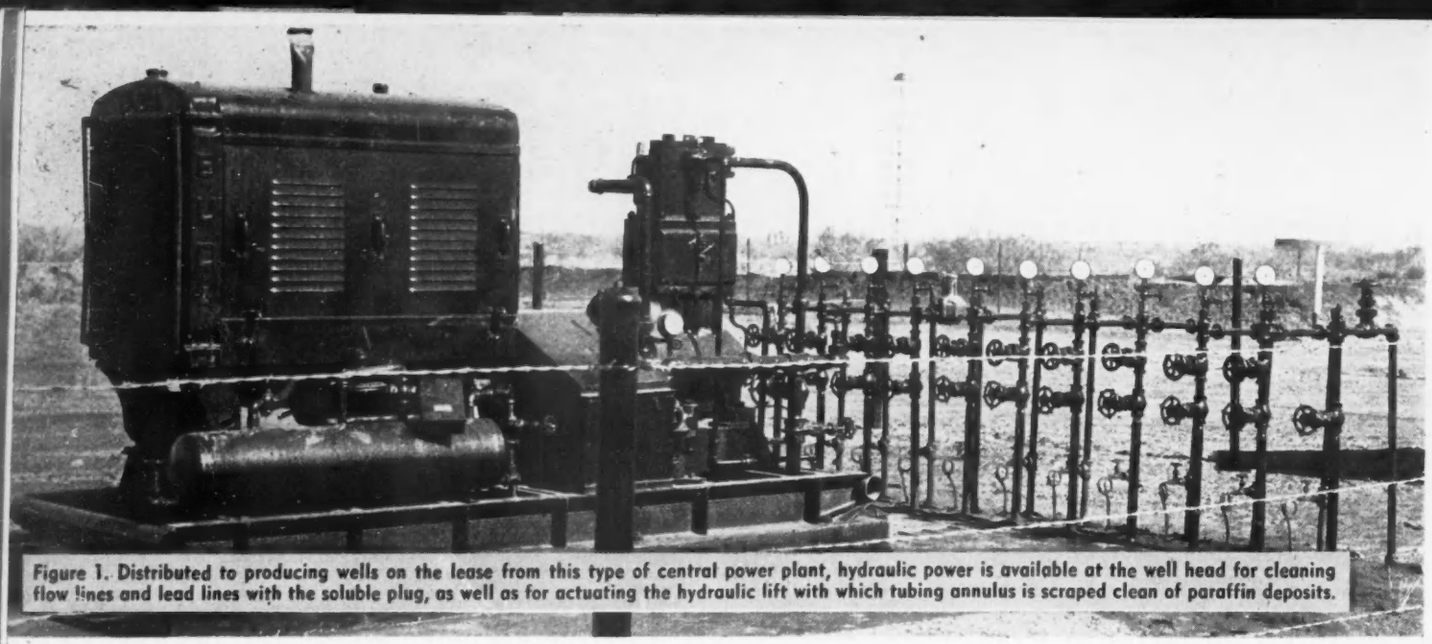


Figure 1. Distributed to producing wells on the lease from this type of central power plant, hydraulic power is available at the well head for cleaning flow lines and lead lines with the soluble plug, as well as for actuating the hydraulic lift with which tubing annulus is scraped clean of paraffin deposits.

Paraffin Control Of Pumping Wells By Hydraulic Power

By GILBERT M. WILSON, Staff Writer

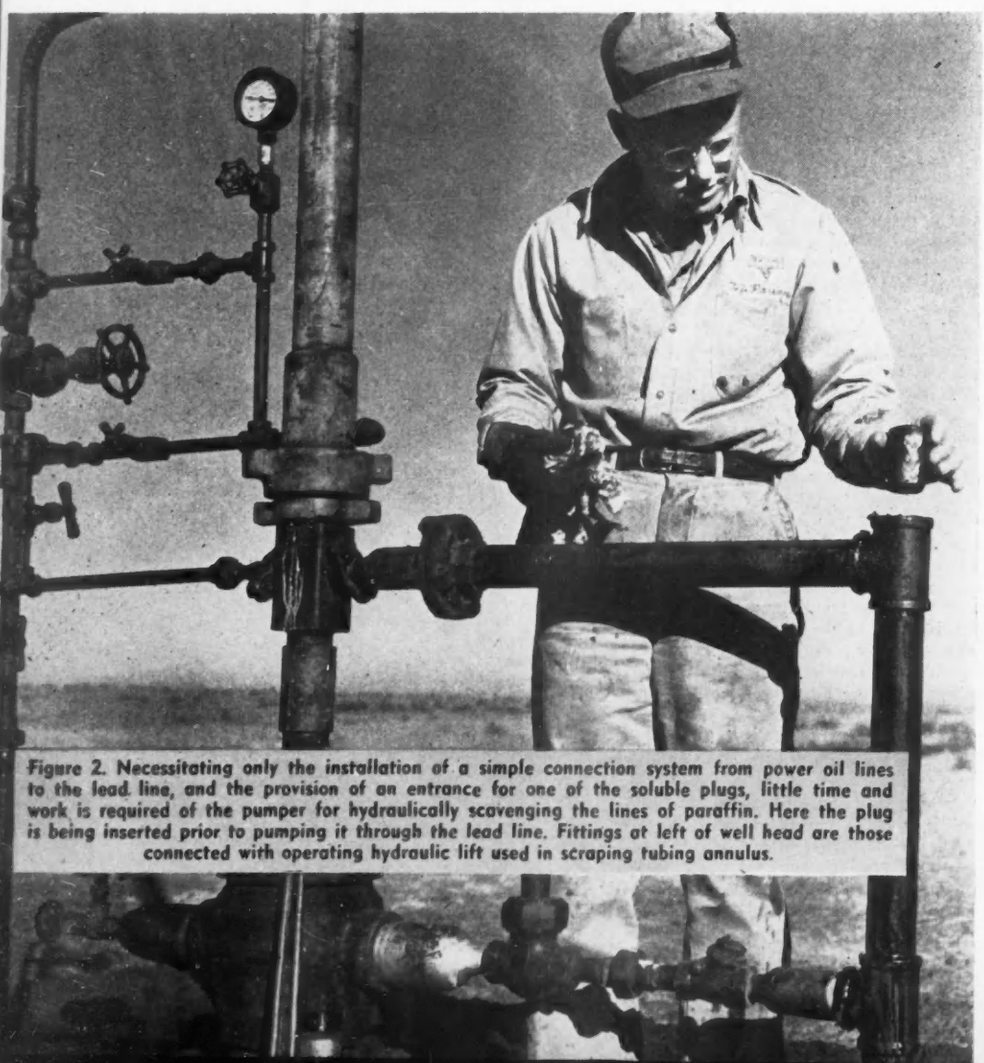


Figure 2. Necessitating only the installation of a simple connection system from power oil lines to the lead line, and the provision of an entrance for one of the soluble plugs, little time and work is required of the pumper for hydraulically scavenging the lines of paraffin. Here the plug is being inserted prior to pumping it through the lead line. Fittings at left of well head are those connected with operating hydraulic lift used in scraping tubing annulus.

THE recent development of simple, inexpensive hydraulic methods of disposing of paraffin in pumping wells and production flow lines is materially decreasing well-servicing expenses in areas where paraffin trouble has prevailed.

The process consists of pumping an oil soluble plug through the tubing or production lead line. The plug, made of materials which cause it to dissolve after being submerged in oil for several hours, will retain its shape long enough to permit it to be pumped through the pipe, pushing accumulated paraffin ahead of it. It is designed to conform itself to abrupt changes in pipe direction. The equipment required is simple and inexpensive, operates easily, and has now been applied to a sufficiently large group of wells in diversified fields to determine its feasibility.

In another application of fluid power, and utilizing the same power on the lease as used for the plug type of cleaning, paraffin is quickly and easily scraped off the inside of the production tubing by hydraulically raising the inner string. Spring type scrapers, positioned at one-joint intervals on the inner string throughout the length of the paraffin zone interval, are pulled through the paraffin deposits, effectively scraping loose the material. Principal advantages of this new procedure are that paraffin control can be handled by the lease pumper merely by turning several valves, requiring no extra labor, or pulling equipment.

Paraffin removal, in the past, has added materially to the cost of pumping many properties. The clogging of production tubing and lead lines in both flowing and pumping wells has been a constant source of trouble since the inception of the industry. While much research has been done toward developing inexpensive and satisfactory methods of overcoming these difficulties and numerous approaches to the problem are in practice, the fact that no standard procedure has been developed in the relatively long period of time during which this difficulty has been experienced, is striking evidence that a better method has been badly needed.

Development during recent years of hydraulic production methods has introduced new ways and means of approaching the problem.

The problem of paraffin control in producing wells easily divides itself into two parts: (1) that of keeping an open

Figure 3. View graphically illustrating effectiveness of soluble plug in dewaxing of surface lines. The large quantity of material being removed reflects a too-long-neglected paraffin condition, but it demonstrates the thoroughness with which plug cleans the line and conforms to pipe fittings and abrupt turns in the system.

bore in production tubing and lease lines; and (2) removing deposits from the producing tubing annulus in pumping wells. The methods followed in attempting to handle these problems in the past have generally fallen into the following three catagories: (1) Chemical; (2) heat; and (3) mechanical. Certainly the most appealing of the three is the possibility of finding a solvent or inhibitor which would hold the paraffin in solution. Some varied progress in this field has been reported from time to time, but large volumes of fluid to be treated and high chemical costs are two hurdles which have been constantly present in the seemingly successful solutions which have been advanced for general application.

Heat has been used with some success, but here again the process has required special conditions to be economical. Its principal drawbacks have been, first, the danger of fire through use of nearby gas or oil-fired heaters; second, its rapid dissipation in cold climates or when transported even short distances in small unprotected pipes; and third, the relatively high cost of steaming the pipe and heating the volumes of fluid required.

The greatest promise of success in approaching the paraffin control problem lies in a mechanical method in which a plug or go-devil is forced through the pipe to scavenge it of the deposited wax.

Essential to Run Go-Devils Regularly

Experience has proved that the successful and inexpensive practice of using plugs and go-devils for wax removal from pipes depends primarily on the maintenance of a close schedule of adequate frequency suited to individual conditions. Paraffin deposits can be removed easily by this method if it is done often enough to move the wax before large accumulations occur and before the wax becomes too hard. There is no way of telling just what schedules should be followed except by observation of the production characteristics of each individual well or group of wells. Such observations are not difficult to make and a satisfactory schedule can be established relatively easily. Failure to adhere closely to such a schedule generally results in the accumulation of excessive deposits which clog the pipe, necessitating expensive tearing up of lines and cleaning with heat.

A primary requisite to such a program is sufficient and convenient power to move the plug or go-devil. An easily applied form is fluid under sufficiently high

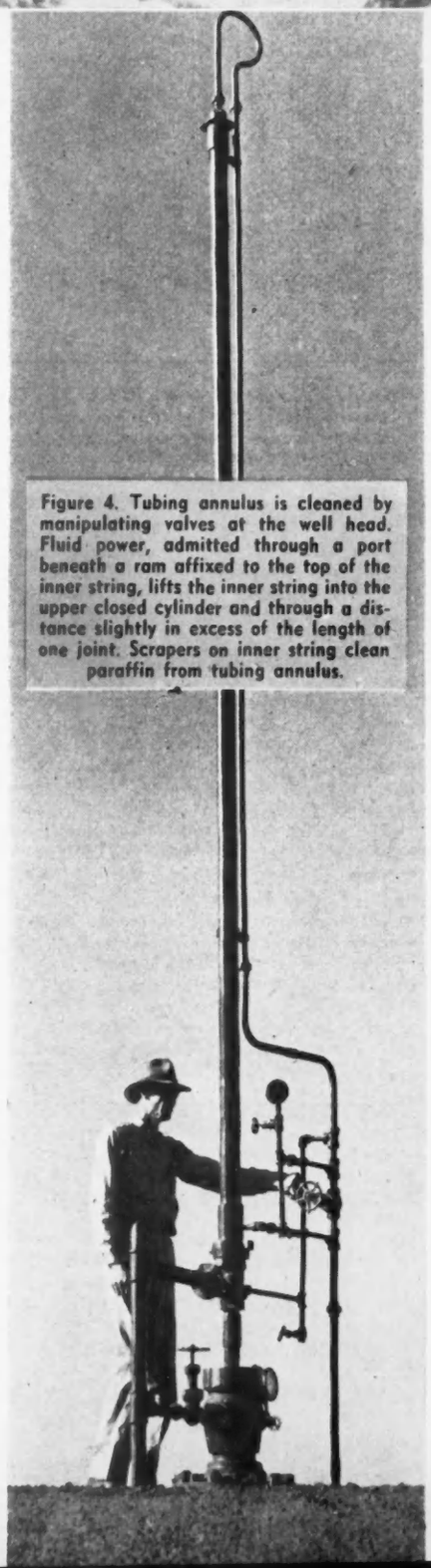


Figure 4. Tubing annulus is cleaned by manipulating valves at the well head. Fluid power, admitted through a port beneath a ram affixed to the top of the inner string, lifts the inner string into the upper closed cylinder and through a distance slightly in excess of the length of one joint. Scrapers on inner string clean paraffin from tubing annulus.

pressures, the latter ranging from 2000 to 3000 pounds per square inch, and it should be in adequate volume in relation to the size and quantity of pipe to be cleaned. When it is considered that during cold spells some oils may require the running of plugs as often as once a week, the importance of having a hydraulic power source convenient to the lease becomes apparent. This is neither difficult nor expensive to arrange and may be accomplished through a permanent or an easily moved, unitized trailer pump arrangement. Undoubtedly, the reason this procedure has not become a more general practice is the fact that an adequate power source has not been conveniently available to most leases.

The problem of retrieving go-devils also has had a retarding influence, particularly in an application of the practice to cleaning the tubing of flowing wells. It has been considered unwise to force a non-soluble plug of wood or steel down production tubing against flowing pressure because of the difficulty of retrieving as well as the possible hazards which would be caused by the leaving of such objects in the well bore. Retrieving of such non-soluble plugs from surface lines is being done, but the process is somewhat costly and troublesome.

From the above brief analysis of the first part of the problem, it can be seen that there have been two basic requirements to be met if the practice of mechanically cleaning flow lines is to be made simple, namely, a constant and adequate source of fluid power on the lease to allow frequent economical cleaning; and a go-devil, or plug which would not have to be retrieved.

Scraping Production Tubing

The second part of the problem—that of removing paraffin deposits from the sucker rods and the interior of production tubing in pumping wells—also is approached logically by mechanical methods.

The usual procedure has been to pick up the rods periodically with pulling equipment in order that they will pass through fixed couplings or scrapers and thus dislodge enough paraffin to keep the tubing open. This, of course, involves the expense of service labor and equipment, and in most cases requires a periodic pulling of the pumping equipment, and occasionally the production tubing string, for steaming and thorough cleaning of the deposits which gradually increase due to the general ineffectiveness of the infrequent and irregularly sched-

uled lifting practice. Here again experience has proved that the only inexpensive and satisfactory answer to the problem is a preventive approach. If a sufficiently frequent schedule of lifting is established to meet the individual well condition, and properly designed scrapers are used, the tubing annulus can be kept clean continually and expensive corrective cleaning jobs eliminated.

In order to make such a practice sufficiently simple and inexpensive, some means of easily lifting the scrapers to pass each other need to be devised. A study of labor and equipment costs shows that to lift a tubing string frequently would be too costly if done by pulling crews. The problem, therefore, has been one of devising a means of utilizing the same power on the lease as used for the plug type of cleaning, and in providing a degree of simplicity of operation that would permit the pumper to operate it without help or too much time.

In summarizing the foregoing it will be seen that the development of a satisfactory method of mechanical control of paraffin has been retarded by the lack of three important factors:

1. A source of constant and adequate fluid pressure to activate plugs or go-devils;
2. A plug or go-devil which would not require retrieving;
3. A means of frequently scraping production tubing which would not require the expense of labor and equipment foreign to the ordinary operation of the lease.

Soluble Plugs Easily Run

The application of the hydraulic methods to the pumping of oil wells has made it possible to reapproach this problem and has resulted in the development of a positive, simple, and inexpensive procedure. Ample fluid under the required pressure is available constantly from the central plant on the leases that use hydraulic pumps (Figure 1), and more important, is available at each well head where it is carried by the power oil distributing system. The hydraulic cleaning of flow and lead lines requires only the installation of a simple cross-connecting system from the power oil lines to the lead line, and the provision of an entrance chamber for a plug to be inserted in the line. This makes the dewaxing procedure a task requiring only a few moments and slight effort. Figure 2 illustrates these connections as they are in use on a large West Texas installation. The operation consists only of opening and closing two valves and removing one bull plug.

The recently developed soluble plug is made of resins and pliolite and will hold its form sufficiently long to effect a strong cleaning action.

Figure 3 graphically illustrates the effectiveness of dewaxing of surface lead lines using the soluble plug method. While the large quantity of material being removed reflects a wax condition which had been neglected too long, it nevertheless demonstrates the degree to which paraffin can clog surface lines to a point where well production could be seriously affected. In some instances, in fact, operators have been led to believe that well production had fallen off, little realizing that the lead lines had been "pinched down" by paraffin accumulations to the point where the line opening possibly was no larger than the diameter of a lead pencil. Continued bucking of high lead line pressure caused by such constrictions doubtless contributes to more frequent line breaks and other breakdowns.

The soluble plugs now being used are made in sizes from one inch to three inch and can be manufactured in additional sizes if needed. The above procedures provide an easy solution to the first phase of the paraffin control problem—that of mechanically cleaning lead lines.

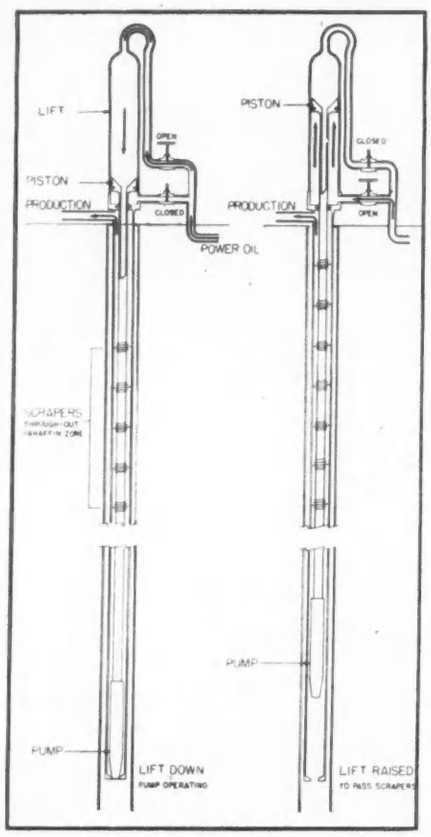


Figure 5. Diagrammatic sketch of hydraulic lift installation showing method of raising and lowering the inner power string which causes spring-type scrapers to clean tubing annulus of accumulated paraffin.

Hydraulic Lift Dewaxes Tubing

The other part of the problem . . . that of providing a simple, permanent, at-the-well-head method of frequently scraping the inside of production tubing . . . also has been solved by development of a procedure wherein fluid power, already available at the well head, is applied to a simple lift or ram which raises the tubing string. Positioned on the power tubing in the zone affected by paraffin trouble is a series of scrapers which effect the required cleaning action. Figure 4 shows one of these lifts as installed, while Figure 5 shows a diagrammatic sketch of the lift, lift controls, and the positioning of scrapers through the paraffin zone. Fluid power, admitted through a port beneath a ram or piston at the bottom end of a long closed cylinder mounted atop the well tubing head, raises the inner string through the length of slightly over one joint, after which it is allowed to return to its normal positions.

The entire operation is controlled by the opening and closing of a single valve in the hydraulic power fluid line and requires only a few minutes of the pumper's time. Still further reducing costs in this type of scraping are the economical spring or coil type scrapers made of stainless steel wire and which are positioned at one-joint intervals on the collars of the inner string throughout the paraffin zone interval.

Operating costs of this method of paraffin control are negligible. An inspection of records indicates a maintenance expense of $8 to $16 per well per year for ram, packers, etc., the costs depending upon the frequency of operation required. Time requirements on lease pumpers also are so small that these duties easily can be worked in with other lease jobs, with no need for overtime or additional labor.

Lifting Costs Lowered

A summation of current practices shows that the application of fluid power to previously well-developed mechanical methods of paraffin control in pumping wells has established a simple and very inexpensive procedure which effects substantial savings in lifting costs. Extensive applications of this method have been made in numerous fields. On several leases in West Texas and Gulf Coast fields where paraffin has always been a pumping problem, and on which these hydraulically controlled methods have been used, wells have gone through two or more years of continuous operation without the use of equipment beyond that described, or labor beyond that necessary in connection with the ordinary operation of the lease. During the same period, offset pumping wells not using these methods have spent from $180 to $1000 per well per year for the removal of paraffin deposits. The method is applicable to deep as well as shallow operations.

Typical of the savings being realized in the field through application of the hydraulic method of paraffin control is the example of two 2-well offsetting leases in a Louisiana field. Clean-out costs for one operator who utilized steaming and other hot-oil treatments for removing paraffin from tubing and lead lines at regular intervals, amounted to approximately $63 per well per month. During this same period on the offsetting two-well lease where hydraulic controls were employed, costs totaled approximately $13.50 per well per month, not including savings resulting from reduced down-time in using the latter system. Bottom-hole conditions in each lease were nearly identical, production being obtained from the Wilcox sand producing 43.5-gravity oil, and with pumps set at between 8400 and 8425 feet.

Undoubtedly there are other interesting uses of this application of fluid power which will develop. One of these has been the use of these lifts for back-washing gas anchors in a field where the collection of bentonite on gas anchor screens caused starvation of plunger pumps. Lifts are used periodically to raise the pump off the seat and flush the gas anchor screens, this being the most inexpensive method yet developed for keeping these wells in a satisfactory producing condition. Here again the ability to apply lease pumping power to other operating purposes without recourse to outside labor or equipment provides the economical answer to a previously costly problem.

Effective Management

Part 5

Sensible Wage Incentives

By G. M. FITZGERALD
Card, Fitzgerald & Leghorn, Management Consultants—Engineers

A SURVEY concerning labor efficiency covering 1000 manufacturers reveals that 70 percent have reason to believe that the effectiveness of their labor is now less than during prewar years. The experience of our own firm here in the Southwest has shown that a general drop of approximately 30 percent has taken place in the past five years. This has been determined in those plants where comparable records were available. During the same period hourly wages have made a phenomenal increase.

One of the principles of economics in American business has always been that the value of an hour's labor increases in proportion to the amount of production accomplished. This principle has operated for the executive as well as for labor. It is interesting to note that although we are operating with different economic systems, this principle has also been recognized in Russia.

Today we witness tremendous pressures applied toward changing this basic concept of relating wages to production. Management is being urged to increase wages without a corresponding increase in production. Unfortunately, this school of thought has been aided by the federal government. The seriousness of this problem is brought out by the fantastic so-called "studies" that receive wide publicity and certain public acceptance. For example, Walter P. Reuther's UAW-CIO study and the U. S. government's recent study of the automobile industry. These studies supposedly proved that the industry can substantially increase wages, that they can sell the product at prewar prices, and that the industry will earn greater profits than 1942. These statements were even too much for the more responsible labor leaders who privately refuted them. Nevertheless, they do indicate a dangerous trend in thinking.

Dangerous Answer

The obvious and easy answer to present wage increases has been a proportionate increase in prices. The chain of events set off by a price increase are familiar to all. Certainly nobody is opposed to labor or anyone else increasing their earnings. But, higher incomes do not in themselves necessarily mean a high standard of living. Many of the boys who early went into the armed services have learned that. Some were making modest salaries when they left their jobs early in 1942. Many have recently returned and have received very substantial increases in income. They have been surprised and disappointed to find that regardless of the salary increase their standard of living is not as high as before the war.

Much of this fallacious thinking on wages can be corrected by asking one question: What has been the greatest factor in making the American way of life the envy of the world? It has been the increasing effort of American business toward production of improved products at lower cost. Lower cost, greater markets, the universal use of better products by more people has made our people rich, not necessarily in terms of money but in terms of finer living and all that is implied by the term "higher living standards."

For too many years in the recent past, lower cost has been given little thought in the majority of business. Today business is in a turmoil of uncertainties. Yet the more far-seeing executives are already planning for the returning of competitive markets. In the Southwest area of the United States manufacturing facilities have been greatly enlarged in the past five years. Many companies have increased their engineering and research staffs. Five years ago some manufacturers had no real competitive worries. They built specialized items, or what competition they had was quality competition. Tomorrow's competition will be quality and price competition and it will be rough.

With this background, it is easy to understand why many top management groups are looking toward wage incentives with renewed interest. In any such management group and in any such discussion will be found an executive who has been hurt or who knows some company that was hurt sometime previously by an incentive plan. Unfortunately, incentives have traveled a rocky road. Probably no other management tool has been so little understood or so generally misused. It is for this reason that a concern should give it intelligent consideration before establishing such a plan.

Few more effective management tools can be found than a properly designed, carefully applied pay incentive plan

The theory of wage incentive is certainly simple enough. It is nothing more than extra compensation paid an employe for what he produces over and above a fair day's work, when he has performed his job in the specified manner and produced accepted results.

While it is a negative approach, it may be best first to examine why the application of this simple theory has failed in certain cases. Failures due to price rate cutting, unfair time studies, standards based only on past records, bonus cutbacks, and other deceptive or unsound practices will not be discussed. Rather we are interested in failures when the plan was being honestly presented. Analyses of plans that have been discarded reveal the following weaknesses attributed to their failures.

1. *Failure to understand the full significance of an incentive plan and consequent lack of preparation for its installation.*

While it is difficult to line up the reasons for failures in the order of importance this failure is undoubtedly the most outstanding. To walk out on a job, take a study, and set a standard, is the shortest cut known to create management headaches. First, the real point of the entire incentive idea is missed, that is, the elimination of waste. Secondly, where this has been done, sooner or later, an ingenious worker quickly learns to improve the job at no greater effort to himself. He then beats the standard so badly that a whole series of labor problems develop. Wage incentive is the end result of the plan. It should be preceded by surveys of layout, production planning methods, and equipment.

2. *Failure to place the installation or maintenance of the program in charge of qualified competent men.*

Many remember or have read of the "efficiency experts" that followed World War I. It took years to undo the damage done by these untrained, unqualified and sometimes openly dishonest men. Today's management should take grim warning that another such period is coming. Men who are qualified neither by education, training, or by experience are setting themselves up as consultants. Wherever these quacks have practiced there has been employe discontent, strikes, and production difficulties. While management is naturally interested in making the installations at as reasonable cost as possible, the caliber of the men making or maintaining the

plan should not be lowered. Some plans were found discarded because they involved too much paper work or the rework and spoilage increased. In such cases, however, it was not the principle of wage incentive but the poor installation of the plan that caused the failure.

3. Failure to properly prepare all employes of the organization for the plan.

This included all levels of the organization, from the top executive to the workers. In many cases it was found that the first step, so often overlooked, was a carefully written policy and procedure covering all phases of the plan. Other failures were traced to lack of understanding by the supervisors of the program. All members of the organization should be shown all there is to see about the plan. Wherever mystery surrounds the installation, there will be trouble.

4. Failure to tie in quality standards with production standards.

In many cases it was found that the failure was due not to the incentive plan, but to the company's lack of specified material and quality standards. A good incentive is always tied into acceptable quality standards.

5. Failure to properly maintain the incentive program after its installation.

Just as a good tool needs periodic sharpening the incentive plan must be constantly kept up to date. Where a plan had been discarded because some employes' earnings had become excessively high, it was found that the standard no longer pertained to the job. Improvements had been made but the standards were left unchanged.

Balanced Pay Schedule

6. Failure to maintain a balanced pay schedule.

Where pay rates are not in proper relative balance and there has been no job evaluation of the pay schedule, a wage incentive is likely to emphasize existing inequities. This has distorted some plans badly enough to cause their abandonment. The coverage of the incentive plan has also affected the wage schedule. Where incentives are installed for some workers and other groups are not given equal advantage for increased earnings, grievances will develop. The plan should be given as complete coverage as feasible.

An understanding of these causes that have resulted in the failure of incentive plans in other plants will help management assuring the success of their own plan. It is easy to understand why many executives are confused or actually afraid of wage incentive. Consider that there are more than 25 that have been considered different enough to be given a specific name by their originator. Some of these plans are so complex that engineers have difficulty in working with them. Is it any wonder that the uninitiated are frightened at such an array of slide rule gymnastics? The trend for some time has been away from the complex types of plans. What industry wants is a simple, understandable plan. This could be called a sensible wage incentive.

All the recently mentioned names with minor variations fall into the following five basic plans:

1. Measured day work.
2. Multiple time plans.
3. Halsey constant sharing plan.
4. Rowan variable sharing plan.
5. One hundred percent time premium or piece work.

Analyzing the type of work, the plants' mechanical condition, the quality requirements, and the available production and time records will determine the plan most suitable for a given plant.

Plan Must Be Needed

The foundation for a sensible incentive plan can begin only after it is determined that an incentive plan is needed. That may sound so elementary as to be foolish. Only recently, however, an executive stated that he had decided to go ahead with a bonus plan to move production more rapidly through his shop. His case sounded reasonable but a brief survey of his plant disclosed that his first trouble was lack of production planning. An incentive installed at that time would have been chaotic. Proper scheduling would substantially reduce his labor cost and prepare his shop for further savings through incentive.

Considering that conditions warrant the incentive plan and that the organization is prepared for its use, the following fundamentals should govern its development:

1. The plan must provide increased compensation in direct proportion to increased production.

Some of the early plans held back a portion of the employes' bonus earning to provide a fund for the maintenance of the plan or to provide a bonus for the indirect workers. This practice gave the labor unions strong arguments against incentives. If the production standards are right then the worker deserves any gains he can make in bettering the standards. The individual incentive where the employe actually can see the results of his increased production is the ideal type of plan. This is not always possible and in its place a good group incentive comprised of related teams may be just as strong. In group incentive a caution must be taken to assure that the work assignment given the individuals is fair and in balance to all other members of the group.

2. The task level or the determination of what makes a "fair day's work" must provide incentive to sustain increased employe output.

This is one of the technical points in building a sound, effective incentive plan. Many factors enter into the selection of the point that may be called normal or average, expected or standard production. The standard output is the amount of production the management may fairly expect from the employe in return for the guaranteed hourly rate paid the employe. This important factor is often overlooked by management and frequently misinterpreted by employes and their representatives.

In the majority of cases the savings to management made possible by an incentive plan is the increase in production from the pre-incentive level to the standard required and the savings in overhead expense. It is because of this that the saving made possible by production in excess of standard may well be passed on to the employe. The determination of a fair day's work must be correct. It can be too high as well as too low. Production requirements placed too high will kill incentive to produce. Placed too low the company is paying bonus for work that should be done as part of the regular day's productio.. Long experience has shown that the bonus earning required to make an incentive effective must be at least from 15 to 30 percent. This spread in percent is caused by the industry, type of work, area wage practice and other reasons that make generalization difficult.

3. Production standards must be set by time study or determined from time study data.

Some incentive plans in the past were set on the basis of past performance or the shop foreman or superintendent's estimate. It is such plans that have bred distrust between the managers and the workers. Estimates, regardless of who makes them, do not establish the proper level of attainable production. Loose estimates can cost management their business; tight estimates will end in labor strife.

Careful time study offers the only sound basis for establishing production standards.

A production standard represents the time required to perform the job at normal speed plus allowances for personal needs, and necessary rest and in some cases for unavoidable delays. Standards must reflect increased effective effort which may or may not be in proportion to increases in measured output. Standards so set by time study are economically and psychologically sound.

Many mistakes have been made in the name of time study, and usually in ignorance. If time study consisted of no more than clocking a job and recording the results, industrial life would indeed be simpler.

There are time study men who probably feel they are qualified but who are making serious technical mistakes. For instance, one can still find standards determined by averaging actual watch readings and leveling factors. Some men discard inconsistent readings without determining why they were inconsistent and thus miss the whole field of cost reduction. Some studies are even set up on an overall efficiency rating basis. Much has already been written about time study procedures and we will not attempt to review the subject here. However, management does need to understand that it is highly skilled, specialized work.

Job-lot shops or specialty manufacturers often believe that the expense of maintaining standards through time study would not justify the cost involved. This would be true if it were necessary actually to time study each job. For such cases time study is used to develop standard basic data on a work element basis. For instance, the work may be warehousing. Obviously, time studies could not be made of all the possible combinations of moving and shifting boxes within the warehouse. Careful time studies will establish the basic time required to handle a single box in relation to weight, number of feet moved, and height stacked. The accumulation of a series of values to cover each element of work enables the compilation of a standard data table. From this table, given the number of boxes moved, the distance moved, their weight, etc., the standard time can be found easily and quickly.

4. Control of production counts and inspection of completed work.

Hand in hand with an incentive plan comes paper work. It would be absurd to say that a plan will not increase the clerical demands. Occasionally it is found that some reports credited to the

• CONTINUED ON PAGE 50

"Enough said!"

Specify

PATTERSON-BALLAGH

A DIVISION OF BYRON JACKSON CO.

"Best Bet Yet"

CASING PROTECTORS

Main Office:	Mid-Cont. Dist.:	Export:	Rocky Mt. Dist.:	Export:
1900 E. 65th St.	P. O. Drawer 2198	92 Liberty St.	1621 E. Yellowstone	210 Post Street
LOS ANGELES 1	HOUSTON 1	NEW YORK 6	CASPER, WYOMING	SAN FRANCISCO 8

Varying Mud Power Pump

By G. C. MacDONALD, Drilling Engineer
Gypsy Division, Gulf Oil Corporation

AN INTERNAL combustion engine-driven power pump on the customary power rig seldom operates in a manner which derives from that pump its full potentialities. This would not be too serious if the pump only were concerned, but it is unfortunately true that the mud costs, the quality of the samples and the subsurface information to be derived from their examination, the rate of penetration, and the life of some items of drilling equipment can be influenced seriously by the manner in which the pump is operated. A great majority of the pumps on power rigs are V-belt driven from engines placed behind the draw works, and in an effort to improve the engine service, the engines are run at as nearly a constant speed as possible. While this does increase engine life and contribute to lower engien maintenance, it reduces appreciably the ability of the pump to deliver the kind of service which will aid in the rapid, economical drilling of a well. Speed changes to the rotary table are provided by gear boxes and other devices which permit constant engine speeds, but the pump is usually tied rigidly to the engines and changes in pump speeds are possible only through change in engine speeds.

Constant Pump Speed

The net result of this inflexible drive from engine to power pump is to assure a very nearly constant pump speed during the entire drilling operation at a given well. It is true that while coring or performing other specialized activities, varying pump speeds will be provided by altering the engine speeds, but those instances are seldom of long duration and constitute but a small portion of the overall drilling time. The power pump on a power drilling rig runs at a very nearly constant speed from the time a well is spudded until it is completed.

At the top of the hole where large pump liners are installed, the fluid output of the pump is at a maximum and the upward velocity of the mud in the annulus is usually sufficient to keep the hole clean with very low quality mud, often no more than dirty water. But as the depth increases, the circulating pressures increase and it eventually becomes necessary to reduce the liner size to handle the increased pressure. The need for reduced liners is occasioned by the need to reduce the stresses in the gear end of the pump, not the fluid end. The fluid end is the same for all size liners, but the load on the gear end is the product of the area of the piston and the pressure on it; when the pressure goes up the area must come down. This load on the gear end of the pump is commonly called the plunger load and is transmitted to the bearings and gears and must be held below a definite quantity to prevent premature failure of the pump. A pump will operate within its designed safety factors as long as some one definite plunger load is not exceeded. As shown above, higher pressures may be handled with smaller pistons but, of course, each reduction in piston and liner size reduces the fluid output of the pump for each stroke. It may be seen, therefore, that because the pump is customarily run at the same speed from the top to the botom of the hole with a progressive reduction in liner size as the circulating pressures increase, the quantity of fluid circulated by the pump decreases as the hole progresses. Near the bottom of the hole where the fluid demands may be at a maximum, the pump is actually delivering the smallest quantity of fluid.

The quantity of fluid circulated by the pump, the size of the drilled hole, and the outside diameter of the drill pipe determine the upward velocity of the fluid in the annulus between drill pipe and hole. The size of the hole is usually fixed by the internal diameter of the casing string through which the hole is being drilled. The pump normally is run at a constant speed, but every reduction in liner size reduces the fluid output of the pump and hence the annular mud velocity drops until at some point that annular velocity is insufficient to carry the cuttings from the hole with the kind of mud that would be adequate for all other hole requirements. At that time it becomes necessary to begin mud conditioning to maintain a clean hole. This usually increases the pressure necessary to circulate the mud and hastens the time when another reduction in liner size is necessary. Very often, while drilling in the lower portion of the hole with inadequate fluid volumes, the pump will be operating at but a fraction of its potentialities, considerably under its designed plunger loads, yet the need for additional fluid is critical and the lack of that additional fluid may cause excessive mud costs. The mud characteristics developed to compensate for inadequate annular velocities may retard the drilling progress and impose unnecessary circulating pressures on the drilling equipment.

Four and one-half inch outside diameter drill pipe is used to drill a variety of hole sizes, and the fluid demands for the larger-sized holes to develop satisfactory annular velocities is considerably greater than that necessary for smaller holes. A given pump might perform satisfactorily while drilling a 7⅞-inch hole and be totally inadequate in a 9⅞-inch hole. Table 1 lists the annular velocities that would be developed in various-sized holes drilled with 4½-inch outside diameter drill pipe at three rates of pump circulation.

Varying Mud Power

These and other values are shown graphically in Figure 1. The quantity of fluid necessary to develop the same annular velocity in different-sized holes is apparent from an inspection of these data and may be seen to vary widely. Nearly twice as much fluid is required for a 9⅞-inch hole as is needed in a 7⅞-inch hole. Very often discussion of fluid capacity of a given pump will be based upon the use of the maximum-sized liners at the maximum recommended operating speed and the fact totally overlooked that the liners probably will be reduced in size during the drilling of a well and that very seldom is the pump run at the maximum recommended speed.

Pumps will usually operate at very nearly 100 percent volumetric efficiency provided that the exact length of stroke and the slight compressibility of the fluid is taken into account, but in the absence of that precise data it is customary to apply some factor to the nominal rating of a pump to arrive at a reasonable value for its discharge capacity. One such pump capacity table is presented in Table 2, which assumes a volumetric efficiency of 93 percent, deducts common rod sizes and shows gallons of fluid handled per complete pump revolution for duplex double acting power pumps. A very close approximation of the fluid handled by a pump may be had by multiplying the values shown in Table 2 by the pump revolutions per minute.

Horsepower Factor

The importance of the plunger load on a power pump was earlier discussed wherein it was pointed out that the product of the area of the piston in square inches and the pressure on that piston in pounds per square inch must not exceed a given amount so that the stress in the gear end of the pump will be held below the designed limits. One other consideration is necessary to the full development of the current discussion, that of horsepower. It is customary to apply horsepower ratings to pumps, such as 150, 200 or 250 horsepower as a measure of the capacity of a given pump. The amount of work, i.e. horsepower, a pump is performing can be quickly determined by multiplying the gallons of fluid handled per minute by the pressure

Speeds

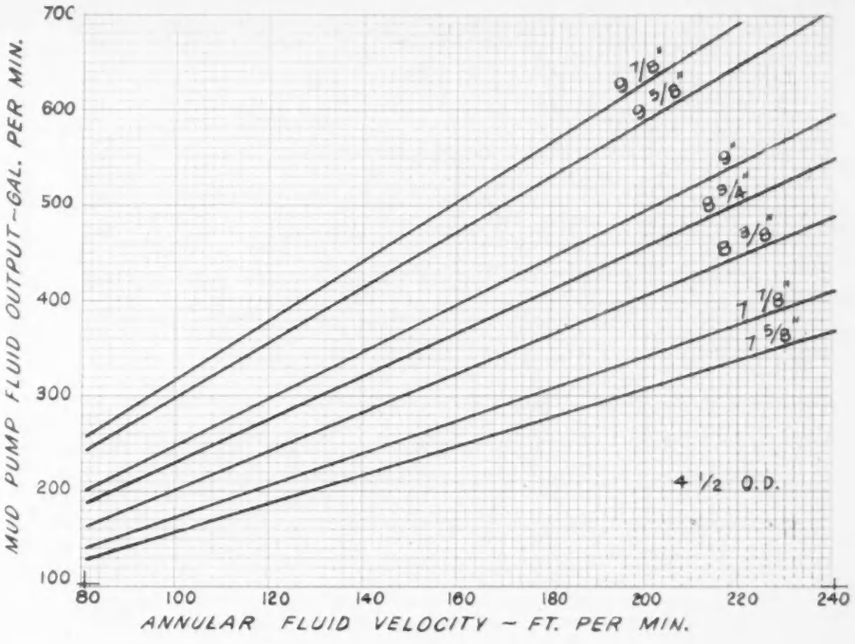


FIGURE 1

at which it is handled, by the factor 0.00059.

The gallons of fluid which will be handled with a given liner size for a given pump operating at some definite speed may be quickly obtained from Table 2 and the only other factor necessary for the calculation of the horsepower required to operate the pump would be the pressure and an estimation of the horsepower loss through the pump. Again, each pump presents an individual problem, but an average loss of 15 percent through the pump can be accepted as a reasonable value; therefore, if input horsepower were desired instead of output hydraulic horsepower, the product of the rate of circulation and pressure should be multiplied by 0.000694 instead of the value 0.00059. The circulating pressure will vary with depth, etc., but the values which will be used subsequently are taken from actual observations in the field and while they may not represent pressures universally encountered, they will suffice to give definite values to the factor of pressure.

A 7¼ x 14-inch power pump of a popular make is designed for a maximum plunger load of 22,700 pounds, which means to the operator that with 7¼-inch liners the safe operating pressure is 550 pounds per square inch. Many of these pumps are in operation in the field and it has been observed that the usual operating speed, is approximately 50 strokes per minute. This pump is rated at 200 horsepower at its maximum recommended speed of 60 strokes per minute. If this 7¼ x 14-inch pump were run at 50 strokes per minute it would deliver 448 gallons per minute which would develop an annular velocity of 181 feet per minute between 4½-inch outside diameter drill pipe and a nine-inch hole. At a depth of 1000 feet, the circulating pressure would be approximately 280 pounds per square inch, only 87 horsepower would be going into the pump, and the plunger load would be 11,530 pounds or approximately half the value for which the pump was designed. At 4000 feet the circulating pressure would have risen to 553 psi, the plunger load to 22,800 pounds, the input horsepower to 171.5, and it would be time to reduce the liners in the pump because the plunger load had reached the maximum permitted even though the supposedly 200-horsepower pump had had a maximum of 171.5 horsepower put into it by that depth.

A reduction in liner size to 6¾ inches probably would be made at that point which, still at 50 strokes per minute, would reduce the output of the pump to 386 gallons per minute and the annular velocity to 156 feet per minute. The reduction in volume would drop the circulating pressure to approximately 450 psi with a drop in horsepower requirements to 120.5 and the plunger load would fall to 16,100 pounds. But about that time the reduction in annular velocity from the original 181 feet per minute to 156 feet per minute would begin to be manifested in poor samples, cavings and bridges in the hole after a trip and would require the conditioning of the mud to compensate for that lack in annular velocity. There does not seem to be any logical reason for a continuation of a pump speed of 50 strokes per minute with an input of 120.5 horsepower and a plunger load of 16,100 pounds when by merely speeding up the pump slightly sufficient fluid could be circulated to make unnecessary the addition of the mud conditioning agents while still maintaining the plunger loads below the maximum for which the pump was designed.

Figure 2 displays these values graphically from a drilling depth of 1000 feet to 9000 feet, obviously too great a depth for a 7¼ x 14-inch pump in a nine-inch hole, but the extension of the curves to that depth serves to illustrate the statement earlier made that even at the bottom of the hole only a fraction of the pump's potentialities are realized when the pump is operated at a constant speed. At that depth with 6¼-inch liners the pump is delivering 328 gallons per minute at a pressure of 664 pounds, developing 133 feet per minute annular velocity with a plunger load of 20,350 pounds with an input of 151 horsepower. The lack of a variable speed drive prevents the speeding up of the pump above 50 strokes per minute to permit the circulation of more fluid which could be done without exceeding the maximum permitted plunger load. A little more fluid and resultant annular velocity at that depth might make a considerable difference in the amount of mud conditioning that would be required.

TABLE 1

Annular Velocities Outside 4½-inch Outside Diameter Drill Pipe

Hole Size	Circulation Gallons per Minute		
	200	400	600
9⅞-inch	63 ft./min.	129 ft./min.	190 ft./min.
9⅝-inch	68 ft./min.	135 ft./min.	203 ft./min.
9-inch	81 ft./min.	161 ft./min.	242 ft./min.
8¾-inch	87 ft./min.	174 ft./min.	261 ft./min.
8⅜-inch	98 ft./min.	196 ft./min.	295 ft./min.
7⅞-inch	117 ft./min.	235 ft./min.	352 ft./min.

Desirable Flexibility

Steam engine or electric motor-driven power pumps have a very desirable flexibility in that the speed of the pump may easily be varied to maintain always very nearly the maximum pressure for a given liner size, but the operator of an internal combustion engine-driven power pump will nearly always consider uniform engine speed more desirable than varying pump speeds. Although his choice is undoubtedly wise, the possibility of using all of the potentialities of the pump through speed flexibility is attractive when it is considered how much additional drilling expense is involved when heavy mud must be carried for no other reason than to keep the hole clean, especially when the ability to keep the hole clean without the additional mud conditioning lies within reach.

An allustration of what might be possible with the same pump, designed for a plunger load of 22,700 pounds, is shown graphically in Figure 3. The same liner changing program is assumed, 7¼, 6¾ and 6¼-inches, which would permit maximum pressures of 550 psi, 635 psi, and 740 psi, respectively. The input horsepower requirements increase sharply, which permit the circulation of more fluid and the development of higher annular velocities, all without exceeding the maximum pressure or plunger load for which the pump was designed. In addition to reducing the amount of mud conditioning which would be required to keep the hole clean and thereby increasing the rate of penetration, the same pump could satisfactorily be used to drill to a greater depth. This is due

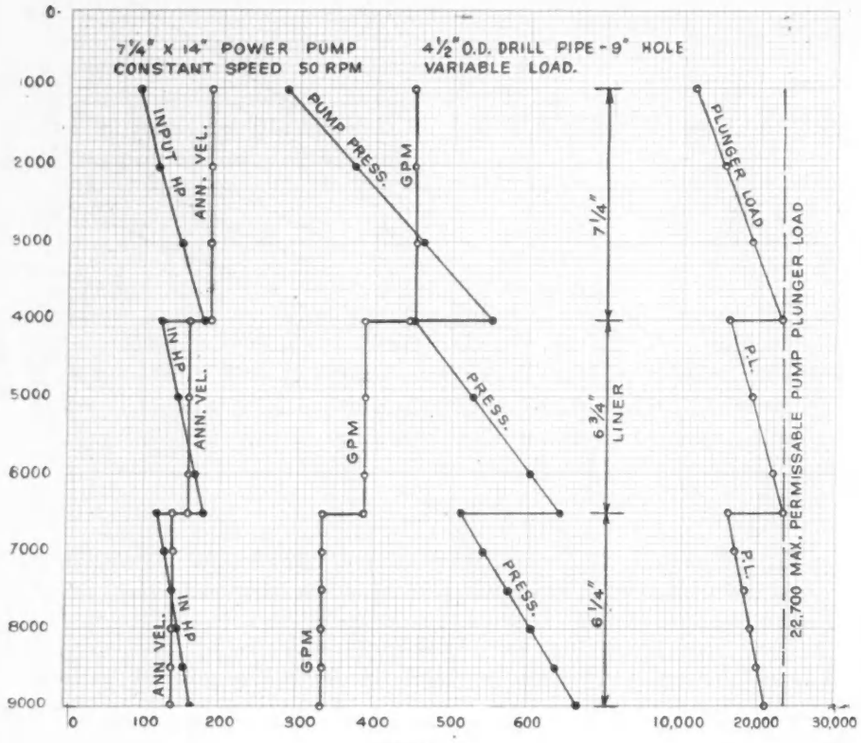


FIGURE 2

to the fact that at the constant rate of 50 strokes per minute, as soon as the 6¼-inch liners are installed, the amount of fluid circulated falls below even the minimum requirements for a nine-inch hole, whereas when the pump speed is increased with the smaller liners, the pump is satisfactory for at least an additional 1000 feet of hole. The increasing of the permissible depth rating from 6500 feet to 7500 feet for the same pump and the more economical drilling to the shallower depth merely by altering the manner in which power is transmitted to it, seems to be worthy of consideration.

The flexibility in pump speed required under the program set out in Figure 3 is not great. The range falls between 49.8 and 65.5 strokes per minute, which seems insignificant. But if the speed ratios from engines to pump were such that at the engine-governed speed of 900 revolutions per minute the pump turned at 50 strokes per minute, not an uncommon practice, to attain the indicated pump speeds, it would be necessary to vary the engine speed between 896 to 1170 rpm. That is considered too wide a range in engine speeds for economical operation; the type of drive required seems almost ideal for a fluid coupling.

Both hydraulic couplings and torque converters are in use on power drilling rigs today, the hydraulic couplings with and without the scoop tube feature which permits a reduction in output shaft speed without altering the speed of the engine or input shaft. The torque converter has the ability to multiply torque at reduced output speeds, and this feature has made it more desired for draw works application and individual rotary table drives and has reduced the demand for it in routine slush pump drives. However, many special service pumps, such as those needed to break circulation, cementing, etc., where high pump pressures are required, hence high torque, for brief time periods are torque-converter driven. The input shaft speed into a torque converter should fall between the range of 1400 and 1800 rpm for most efficient operation. This is higher than the normal speed range of most heavy duty drilling engines, hence some speed increaser unit would be required if the torque converter were applied to many of the popular drilling engines of today. However, those speeds are well within the range of the smaller engines, which also have been adequate to power the special purpose pumps and hence torque converters have been used more frequently on the smaller installations.

Constant Pressure

Both couplings and converters permit the engine to run at nearly the same speed through the entire range of load from zero to dead stall; the coupling at stall would be transmitting the torque of the engine while the converter would be transmitting as much as five times the torque of the engine. The work developed by the engine and not transmitted to the driven member would be manifested in heat in the fluid of the coupling or converter and would be dissipated through a cooler or heat exchanger. Because the torque converter output shaft slows down as the torque demands increase, there is a constant balance between speed and torque and an infinite number of speed variations is available. It would seem that with proper controls to prevent the overloading of a slush pump for an extended period of time, that the torque converter would have a real application to slush pump drives. This is particularly so because whenever a slush pump slows down, the discharge pressure drops because of a reduction in output and the load would thereby be decreased, permitting the converter to again accelerate slightly. It would seem to offer a device by which a very nearly constant pressure could be held on the pump at all times.

Power losses through both the coupling and converter have also been pointed out as factors which are unfavorable to the use of fluid drives on pumps, but an inspection of Figure 2 will indicate that there is considerable inefficiency in the direct drive method of operation when it is considered that all of the area between the plotted plunger load curve and the vertical coordinate representing 22,700 pounds plunger load is wasted pump potentiality. In the direct drive method the power is neither generated nor used. With a fluid coupling more power is generated and some of it lost through the inefficiency of the drive, but enough is delivered to the pump to assure the utilization of a major portion of the pump's potentialities. It would seem that the choice between the two would lie largely with the cost of generating that additional power compared with the advantages to be derived therefrom.

A limited number of pump manufacturers were questioned regarding the advisability of reducing the rated plunger load if the pump were operated continuously at or near that figure instead of only rarely as in the common method of operation. It was believed that the life of any item of equipment would be reduced if it were operated continuously at or near its maximum rating and that therefore, some reduction in the rated load should be made, such as to 75 or 80 percent. Those manufacturers contacted refused to reduce the maximum plunger load rating even for continuous

TABLE 2
Power Pump Capacities

Liner Diameter, Inches	Area Sq. In.	GALLONS PER REVOLUTION—93% VOL. EFF. RODS DEDUCTED							
		Stroke 8" Rods 1¾"	Stroke 10" Rods 1¾"	Stroke 12" Rods 2"	Stroke 14" Rods 2"	Stroke 15" Rods 2¼"	Stroke 16" Rods 2¼"	Stroke 18" Rods 2½"	Stroke 20" Rods 2½"
4"	12.566	1.46401	1.82996	2.14718	2.50505				
4¼"	14.186	1.67270	2.09083	2.43790	2.84422				
4½"	15.904	1.89106	2.36387	2.76554	3.22645	3.35609	3.57985	3.89214	4.32459
4¾"	17.7205	2.12803	2.65999	3.12089	3.64104	3.80035	4.05368	4.42522	4.91691
5"	19.635	2.37466	2.96828	3.49085	4.07266	4.26275	4.54696	4.98015	5.53350
5¼"	21.6475	2.63395	3.29239	3.87977	4.52640	4.74895	5.06552	5.56354	6.18171
5½"	23.758	2.90588	3.63239	4.28767	5.00228	5.25878	5.60939	6.17539	6.86154
5¾"	25.967	3.19046	3.98803	4.71454	5.50030	5.79241	6.17855	6.81569	7.57299
6"	28.274	3.48769	4.35956	5.16038	6.02045	6.34967	6.77300	7.48445	8.31606
6¼"	30.680	3.79756	4.74691	5.62520	6.56273	6.93073	7.39276	8.18167	9.09075
6½"	33.183	4.12009	5.15015	6.10898	7.12715	7.53542	8.03780	8.90735	9.89706
6¾"	35.785	4.45526	5.56903	6.61174	7.71370	8.16391	8.70815	9.66149	10.73499
7"	38.4845	4.80308	6.00380	7.13347	8.32238	8.81603	9.40379	10.44409	11.60454
7¼"	41.2825	5.16355	6.45439	7.67417	8.95320	9.49195	10.12472	11.25514	12.50571
7½"	44.179					10.19150	10.87096	12.09465	13.43850
7¾"	47.173					10.91485	11.64248	12.96262	14.40291

service, claiming that the pumps were designed with adequate safety factors for continuous operation at the plunger loads specified. Experience may justify that confidence.

If it were possible to change pulley sheaves each time the pump liners were changed and thereby increase the pump speed with each reduction in liners, the need for a more flexible drive would be somewhat relieved, but this is undesirable for obvious reasons. Steam or electricity remain the most flexible drilling power and any attempt to approach that type of drive with internal combustion engines involves additional mechanical devices.

It is apparent that the higher the upward velocity of the mud, the larger the cuttings that will be brought to the surface. That is the reason why reverse circulation brings such large objects quickly to the surface. The rising fluid inside the drill pipe or tubing develops very high velocities due to the lesser cross-sectional area. A great number of hole troubles would be eliminated if comparable upward velocities could be developed in the annulus with normal circulation, but this is impossible because the annular cross-sectional area is normally considerably greater than the internal cross-sectional area of the drill pipe. The ratio is about 4 to 1 inside 4½-inch outside diameter drill pipe and in the annulus between the outside of the same pipe and a nine-inch hole. There is a limit to the quantity of fluid that may be pumped down drill pipe without developing prohibitive pump pressures. However, the permissible upper limits of circulation are seldom a problem. The determination of the lower limits is more pressing.

Usually, the necessary mud annular velocities begin to become apparent in development drilling where several rigs are running and are indicated by the mud bill and amount of hole trouble experienced in drilling wells with various-sized pumps and different engine installations. It has been shown previously that the fluid requirements for the larger diameter holes is much greater than the fluid requirements for the smaller holes and, in addition, the character of the rock penetrated influences the quantity of fluid required. A caving hole will require more fluid than a true gauge hole to develop a comparable upward annular velocity, but where rigs are drilling in the same area through the same formation, with the same size drill pipe and cutting the same sized hole, many of the variables are eliminated. Early in 1945 there were more than 100 rotary rigs running in the West Edmond field of Oklahoma, drilling a long section of Pennsylvania sands and shales down to the Hunton lime topped between 6800 and 7000 feet. Nearly all the rigs were using 4½-inch outside diameter drill pipe and were drilling either a nine-inch or an 8¾-inch hole and the mud program varied but slightly between wells.

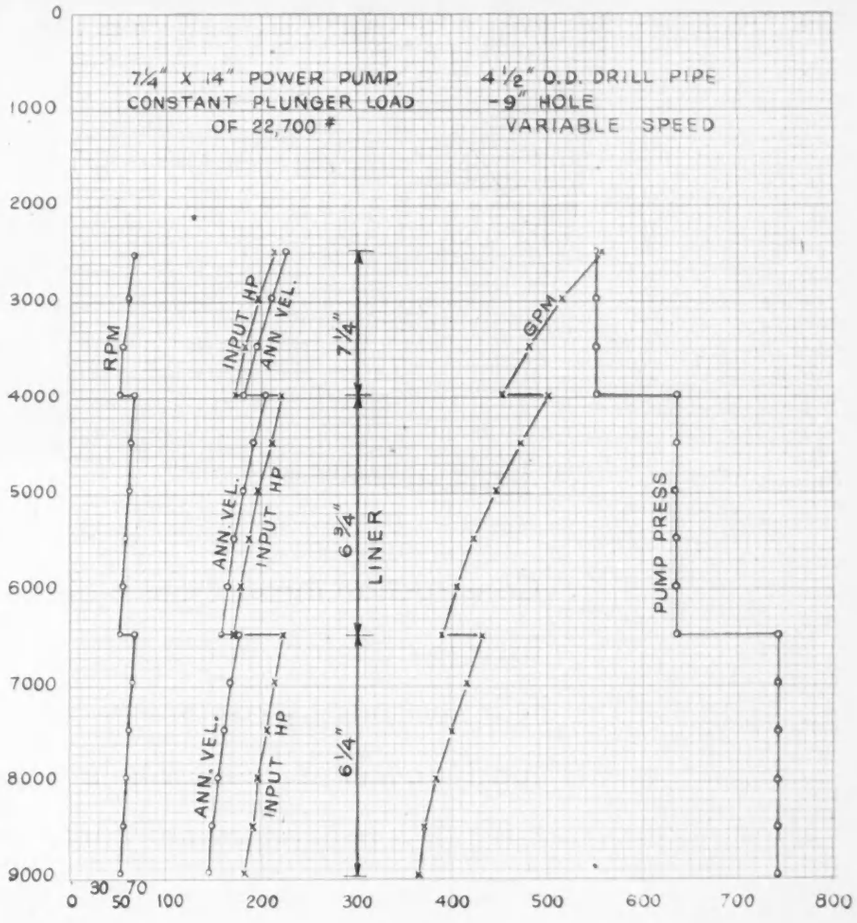


FIGURE 3

TABLE 3

Annular Velocities—West Edmond Field

4½ Inch Outside Diameter Drill Pipe—8¾ Inch and 9 Inch Holes

Less Than 130 Ft./Min.		130 to 149 Ft./Min.		150 to 169 Ft./Min.		170 to 189 Ft./Min.		More Than 190 Ft./Min.	
Vel.	No.	Vel.	No.	Vel.	No.	Vel.	No.	Vel.	No.
115	1	130	1	150	2	171	2	191	1
117	1	133	1	151	1	174	2	195	1
122	1	134	3	152	3	177	1		
125	1	135	1	154	3	178	1	207	1
127	2	138	2	155	1	181	2	210	1
		140	2	156	5	183	1	212	1
	6	143	1	157	1	185	2	218	1
	7.6%	145	1	158	2	187	1		6
		146	1	159	1	188	3		7.6%
		149	2	161	1		15		
			15	162	1				
			19%	163	2		19%		
				164	2				
				165	1				
				167	3				
				168	6				
				169	2				
					37				
					46.8%				
					Grand Total—79				

Average Annular Velocity—160.5 Feet Per Minute.

Survey Made

A survey of 57 of the rigs which were circulating fluid, others were drilling in, rigging up, etc., developed some interesting information on the quantity of fluid being circulated and the resultant annular velocity in a true gauge hole. It is known that the annular velocities calculated were not developed in all sections of the hole because caliper surveys of many of the holes showed excessive enlargement through certain sections. many of the holes were larger than 32 inches in diameter at three levels. However, a comparison based on annular velocities was considered preferable to one based on fluid pumped because by using annular velocity, the difference in drilled hole diameter could be taken into account.

Seventy-nine observations were made on the 57 rigs and the results of the survey indicated that the annular velocities that were actually drilling wells in the West Edmond field varied between 115 and 218 feet per minute, with 46.8 percent of the velocities falling between 150 and 169 feet per minute. The average velocity was 160.5 feet per minute, and while it is not claimed that that annular velocity was actually achieved in all portions of the hole or that even where those velocities were developed 160.5 feet per minute represents the most

It's modern to the minute and rugged as they come!

Construction throughout is unusually rugged, with ample factors of safety in all parts. The engine is started in a few seconds by compressed air to all cylinders, and full load power is available at once. Lubricating oil consumption is exceptionally low and the engine operates efficiently on a wide range of fuels. Horsepower ratings of 280 for the 6 cylinder model and 375 for the 8 cylinder model are very conservative, providing ample reserve power for occasional overload or sudden emergency.

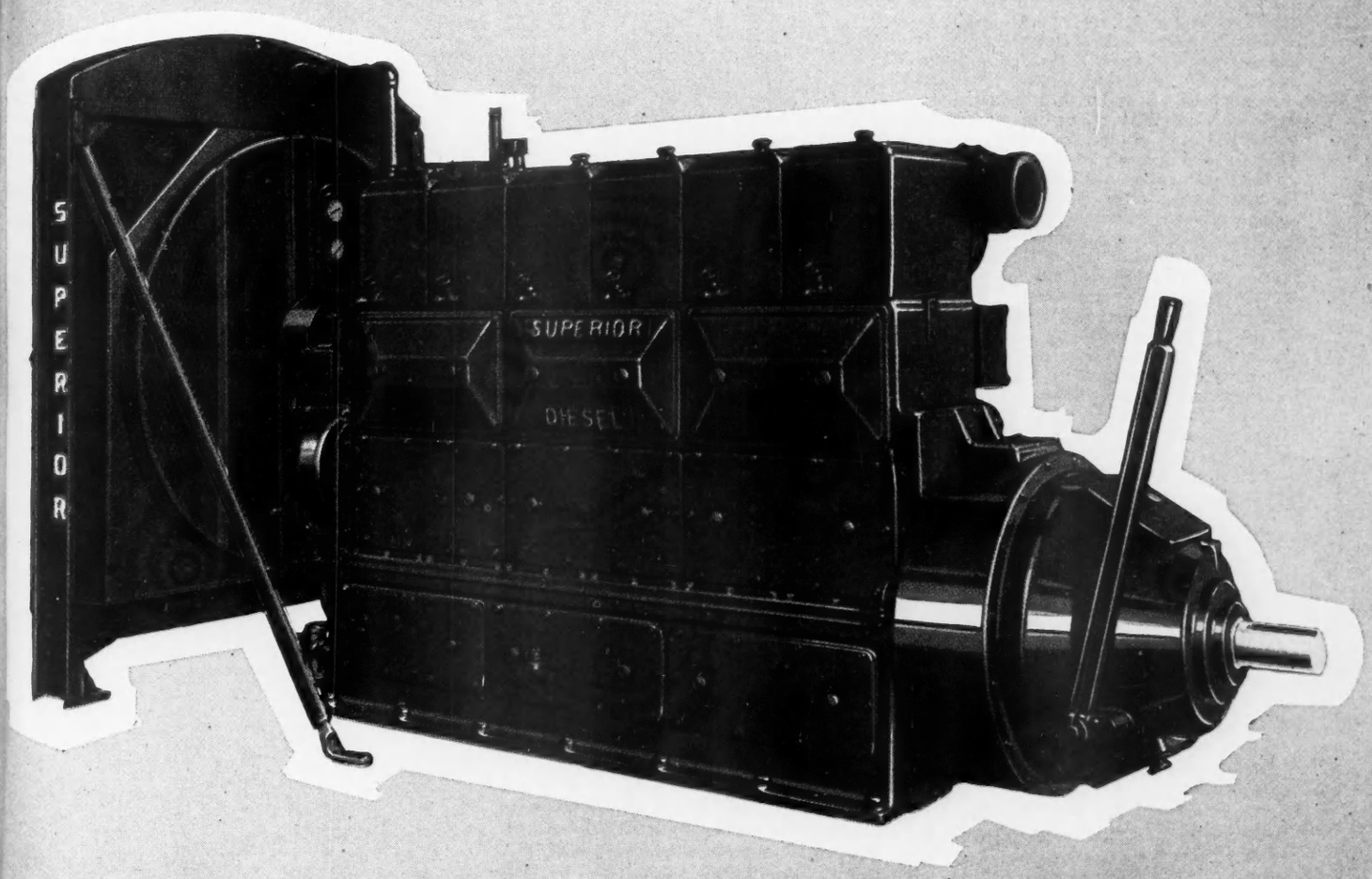
The engine is fully enclosed, with dust-proof and oil-tight covers. Working parts are entirely accessible, as these covers can be easily and quickly removed from the large frame openings to permit easy inspection, quick adjustment or infrequent replacement. All the parts normally requiring service are light enough in weight to permit handling by one man.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO • DIVISION OFFICES: DENVER • FT. WORTH • PITTSBURGH

EXPORT: NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N. Y., U. S. A.; RIVER PLATE HOUSE,

Superior PTD DRILLING ENGINE



• TULSA • TORRANCE

12 SOUTH PLACE, LONDON, E. C. 2

First in Quality — THE NATIONAL SUPPLY COMPANY

NATIONAL BLUE PRODUCTS

TABLE 4

Mud Characteristics vs. Annular Velocities

	Less Than 130 Ft./Min.	130—149 Ft./Min.	150—169 Ft./Min.	170—189 Ft./Min.	More Than 190 Ft./Min.
Average Viscosity	39.6	38.3	35.8	38.4	31.0
Wells Using Clear Water	0%	20%	43.3%	13.3%	83.5%

desirable value, it may be said that wells were actually being drilled under the conditions observed. The individual observations are presented in Table 3.

Varying Mud Power

It is impossible to present data on drilling times and hole troubles to correlate with the annular velocities observed at West Edmond, but in general, higher annular velocities did contribute to faster and more trouble-free drilling.

Mud Cost Reduction

The amount of reduction in mud bill that may be realized by an increase in annular fluid velocity is difficult to predict because nearly always the fluid handling equipment is operating at or near its capacity and it is impossible to increase its capacity for test purposes and unwise to decrease it for mechanical reasons. The total mud bill of all of the wells listed in Table 3 is not available. In addition, the mud program of the wells on which costs are available varies between contractors and between wells. However, two wells on which costs are available were drilled by the same contractor, one with equipment which developed an annular velocity at the observed depth of 134 feet per minute and the other 158 feet per minute. The total mud cost of the first well was $1619 and of the latter well $1416. The lowest available mud bill was on a well in which velocities between 154 and 158 feet per minute were developed. The mud bill was $908. One wildcat in the Mid-Continent area in which mud velocities as low as 124 feet per minute were developed in the lower portion of the hole had a total mud bill of $5869 to a total depth of 9420 feet, and it is believed that the amount would have been substantially reduced with greater circulating rates.

In these West Edmond wells it was customary to use almost clear water and large liners in drilling below the surface pipe and to reduce the liners and mix mud near total depth; the tie in between reduced liner size and improved mud characteristics was inescapable. The trend of these activities is illustrated in Table 4 which presents the average funnel viscosity of the mud and the percent of wells observed using clear water classified by annular velocity. Except for the slight deviation of the 170 to 189 feet per minute classification, the use of more viscous mud at lower annular velocities is uniform.

Varying Mud Power

In none of these wells was there any need for mud to combat lost circulation, blow-outs or water flows. Particularly in the wildcat well, a large portion of the mud used was intended to keep the hole clean and reduce cavings on bottom and bridges up the hole after a trip. There are no precise data which permit the evaluation of changes in annular velocity, but the addition of mud conditioning agents in Mid-Continent wells to improve bit cutting samples is commonplace.

The service required from a 7¼ x 14-inch power pump to develop 160 feet per minute annular velocity between 4½-inch outside diameter drill pipe and holes of various diameters may be obtained from Table 5. It may be seen that the fluid requirements and the pump speeds in the 9⅞-inch hole are slightly over twice the requirements for a 7⅝-inch hole and that the pump speeds must increase almost 50 percent to develop the same annular velocity in the same hole when the liner size is reduced from 7¼ to 6¼ inches. Such speed flexibility is not common on most power rigs and as a result the most efficient utilization of the equipment available is seldom possible.

Varying Mud Power

There is nothing new in the idea that flexibility in pump speeds is desirable, or that larger holes require more fluid than smaller holes, or that the mud must be rising faster than the bit cuttings are slipping, but these things usually have been discussed in a more general than specific manner. The observations, graphs and tables herein presented are intended to attach specific mathematical values to the factors involved so that a better utilization of the routine rotary drilling equipment will be made possible. The advantages of electrically or steam engine driven pumps are quite evident because of the flexibility in speed which permits the operation of a power pump at very nearly a constant load, but lacking such drive, the possibility of using a fluid coupling is suggested. Primarily, however, the point is made that the practice of operating a power pump in drilling service at a constant speed fails to utilize the full potentialities of a given pump and that this failure will result in increased mud bills and longer overall drilling time from spud to completion.

Table 5

Mud Volumes and Pump Speeds Required to Develop 160 ft./min. Annular Velocity Outside 4½-inch Outside Diameter Drill Pipe with 14-inch Power Pump

Hole Size	Gal./Min.	Pump Rev. Per Min. 7¼-Inch Liners	6¾-Inch Liners	6¼-Inch Liners
9⅞-inch	505	56.5	65.5	77.0
9⅝-inch	473	52.7	61.3	72.1
9-inch	397	44.3	51.5	60.5
8¾-inch	368	41.1	47.7	56.0
8⅝-inch	326	36.4	42.5	49.6
7⅞-inch	273	30.5	35.4	41.6
7⅝-inch	248	27.7	32.2	37.8

Effective Management

■ CONTINUED FROM PAGE 47

incentive plan should have been kept all along. There had always been a need for them but the incentive plan made them essential. Arrangements for inspection and production counts must be clearly understood and certainly in writing for all concerned. A good incentive will increase quality of the product as well as quantity. Just as an inspector is used to check quality, so should there be some specific responsible individual to check output. In larger shops this is generally done by the time keeper.

Pay Calculation

5. Incentive pay formulas.

The actual calculation of pay should be as simple as possible for both the company and the employes. Each employe should not only understand how to compute his incentive earnings but should also understand how the bonus factor is derived. The incentive plan should be tied in with the plant's budget and cost control program to prevent duplication of reports. Certainly it is important to make clear to each employe the difference between his base earnings and his bonus earnings for increased effort. This can be assured by listing the bonus payment separately on his check or even paying the bonus separately.

Where conditions warrant, an incentive usually can be designed for any type of measurable effort. How many times have we heard, "Oh, yes, incentives are good on production lines but they would be impossible in my business."

Here is a list of some unusual jobs that have been successfully applied to incentive pay:

Making and matching paint to customer's shade requirements.

Testing radio tubes.

Conducting routine laboratory tests.

Preparing and typing bills of lading.

Sweeping streets — all weather conditions.

Hand-painting pottery vases.

Wiring radar fire control apparatus.

Altering men's ready made suits to customer's fit.

Cleaning chickens.

Hand-blowing small glass items for medical trade.

Bookkeeping — maintaining stock records.

Some unions do not seem to have any uniform policy concerning incentive payment. In some companies they have cooperated in the installation to the point of proving to their own members the soundness of the plan. Other unions have been more backward in their acceptance.

A properly designed and applied wage incentive plan is an effective management tool. It will not substitute for good supervision but rather it will supplement good supervision. It will offer some solutions to the problem of more money for less work, for it pays only on increased productivity. Sensible wage incentive plans carefully administered and understood by all concerned will aid management in holding their place in the competitive industrial world.

Tax Review

A Regular Feature of THE OIL WEEKLY

By WILLIAM O. TAYLOR*

Percentage Depletion Allowed on Net Profit Payments

On January 28, 1946, the Supreme Court of the United States handed down its decision in two cases involving the depletion allowance. One of them, *Kirby Petroleum Company v. Commissioner,* 148 F(2d)80, had gone up from the Fifth Circuit; the other, *Commissioner v. Crawford,* 148 F(2d)776, from the Ninth. In each case, the taxpayer was the fee owner of minerals and had leased them out, stipulating for a share in the net profit from operation of the lease as well as for the customary royalty of a fractional share of oil produced and saved. The government allowed a depletion deduction against the usual royalty income but denied it with respect to amounts received by the taxpayers under the profit-sharing arrangement. The Supreme Court, affirming the decision of the Ninth Circuit and reversing that of the Fifth, held that the taxpayers are entitled to a depletion deduction on the share of net profit received by them.

The court discussed at some length the concept of "economic interest" without being able to clarify that legal will-of-the-wisp any further than to make it clear that it includes the character of interest owned by the taxpayers in the two cases. The decision, although it seems eminently correct, will not stand out as an important contribution to the general field of knowledge of depletion and related subjects.

It should be kept in mind that the taxpayers in the Kirby and Crawford cases were lessors, i.e., they were the fee owners of the minerals. Although this fact was not particularly emphasized in the Supreme Court's decision, it should not be lightly assumed that an assignor of a lease who stipulates for a share of the net profit to be thereafter derived from its operation will also be entitled to depletion on amounts received by him under the profit-sharing arrangement. For instance, the situation in which a lease is assigned for cash and a share in profits has already been before the Supreme Court in *Helvering v. Elbe Oil Land Development Company,* 303 U. S. 372, in which it was held that the assignor was *not* entitled to depletion on the net profit payments. In its recent decision, the Supreme Court discussed the Elbe case and distinguished it from the Kirby and Crawford cases, so that they still appear to approve their decision in the Elbe case.

A more recent decision by the Tax Court in *William R. Murphy* v. *Commissioner* casts but little light on the situation. It, too, involves assignors rather than lessors. The taxpayers, with others, owned a block of leases which they assigned to two oil companies, the latter agreeing to drill a test well and, if it should be a producer, to develop and operate the block and pay the assignors one-fourth of the profits from operations. The transaction differed from a straight net profit deal in that the assignors also shared in profits from sale of the leases or an undivided interest therein. The assignors and the oil companies entered into an operating agreement which designated "operator" and "non-operators," incorporated an "accounting procedure," referred to the joints lease," and, in general, seems to have very closely paralleled the usual agreement covering joint operations. The Tax Court, in deciding that the taxpayers were entitled to depletion, appears at first to say that, in spite of the fact that the assignors assigned all their interest to the oil companies, the whole transaction was in substance a joint operation and that the legal means by which it was carried out were adopted solely to facilitate operations. In the opinion of the writer, the court could well have stopped at that point, for up to there, the decision was one which turned on the facts of the case and on the court's determination of the substance of the transaction as opposed to its form.

However, the court went on to point out that the share in profits to be received by the assignors was the "only payment" to be made by the oil companies for the right to extract the oil and that such payment was "dependent entirely upon the sale of oil and . . . would end only upon the exhaustion of the supply." It was said that such payments "should be regarded as rents or royalties." In this part of the decision, the court seems to be trying to fit the net-profit payment into the definition of "economic interest" on the strength of its own characteristics. Not only does this part of the decision seem somewhat inconsistent with what was said by the court earlier in the decision, but it also appears inconsistent with the Supreme Court's decision in the Elbe case, unless the latter case is to be differentiated by the fact that the assignor there received a substantial cash payment as well as a share in profits.

There may still remain a question as to a stipulation for a share in net profits in the assignment of a lease, where the assignor also retains an over-riding royalty. As was pointed out above, the taxpayers in the Kirby and Crawford cases reserved royalties as well as a share in profits. In a footnote to its decision, the Supreme Court said, "While the reservation of royalties shows an economic interest in the oil necessary for the satisfaction of the royalties, such reservation would not show an economic interest in oil not necessary for the payment of royalties." This might seem to indicate that, in an assignment in which the assignor reserved an overriding royalty *and* a share in profits, the presence of the former would have no bearing on the question of depletability of the latter. However, it is well established that the reservation of an over-riding royalty results in an assignment being treated as a sub-lease rather than a sale for tax purposes, and it should follow that the assignor in such a case should receive the same treatment as did the lessors in the Kirby and Crawford cases, i.e., he should get depletion on his share of the profits.

Another phase of the question will be decided by the Supreme Court, which has agreed to review the decision of the Fifth Circuit in *Burton-Sutton Oil Company* v. *Commissioner,* 150 F(2d)621. Burton-Sutton was the assignee of a lease and agreed to pay its assignor 50 percent of the net profits. It took the position that the arrangement was, in substance, a joint operation and that its income should be reduced by the amounts paid to its assignor. The government's argument, which was sustained by the Fifth Circuit, was that Burton-Sutton acquired the entire leasehold interest, that the arrangement was not a joint operation and that amounts paid by Burton-Sutton to its assignor were payments for acquiring the lease, which it could not exclude from its income.

The tax problems of the assignor and assignee or lessor and lessee in a transaction involving a sharing of profits are closely related. In any instance in which the assignor or lessor is entitled to depletion on payments received, the assignee or lessee, as the case may be, should be entitled to exclude such payments from its income. By the same token, if the one who receives the share of profits cannot deduct depletion, the other party to the transaction must include all the earnings in his taxable income.

* The author is a member of the law firm of Butler, Binion, Rice & Cook, Houston.

☆

C. H. Wright Is Again Chosen Sunray Oil Corporation Head

C. H. Wright was reelected president of Sunray Oil Corporation and all other officers were reelected at a meeting of the board of directors in Tulsa, which followed the annual meeting of stockholders in Wilmington, Del.

Officers reported crude production for the first quarter reached 1,756,750 barrels as compared with 1,682,409 barrels for a like period in 1945.

It was also announced that Sunray has taken over operation of properties in Santa Barbara County, California, consisting of a refinery and 25 producing wells and 1200 acres of leases, purchased from the Bel-Air Oil Company and Bell Oil & Refining Company of California.

To Double Research Plant

The Carter Oil Company recently revealed plans to double the size of its Tulsa research laboratory and shops as soon as labor and materials became available.

Upward Drilling Trend Maintained in April

THIS year's increased drilling trend continued during April, and the first quarter's 12 percent lead over last year's well completions was maintained. This is a further indication that the industry will drill at least 10 percent more U. S. wells this year than in 1945. There were fewer active rigs at the end of April than at the same time a year ago, which reflects the improved quantity and quality of labor and materials available for this stepped-up drilling program.

During the four weeks ended April 27 there were 2210 wells completed in the U. S., an increase of 175 wells over the 2035 completed during March and 192 over the 2018 wells in April of last year. Of the 192-well increase over last April, 127 were oil or distillate wells.

In the first four months of the current year there have been 8575 wells of all classifications completed, which represents an 11.9 percent increase over the 7665 completions made during the comparable period of 1945. This percent increase is slightly less than the 12.5 percent lead the first three months held over the previous year. The states sharing most of the responsibility for the increase are Texas, Oklahoma, Louisiana, Illinois, Kansas and Ohio.

Texas showed a 10.3 percent rise over last year by completing 2554 wells compared to 2315 for the same period of the previous year, and Oklahoma completed 818 wells to mark an increase of 12.1 percent. The northern district of Louisiana offset a small decline in the southern district to give the state an increase of 28.4 percent, and Illinois rose by 31.2 percent. Ohio and Kansas reported increases of 43.7 and 36.5 percent, respectively. California completed 595 wells compared with 638 for last year's period, a drop of 6.7 percent, and Mississippi dropped considerably from 120 to 74 wells. New Mexico and Michigan reported decreases of 21.5 and 7.2 percent, respectively.

On April 30 there were 3890 rigs drilling or rigging up in the U. S., an increase over the 3680 reported at the beginning of the month, but less than the 4036 active on April 30 last year. The number of rigs shut down on the last of April totaled 515, compared with 542 a year ago. California reported 271 rigs working, considerably less than the 316 active a year ago. The Panhandle, West, and Lower Coast districts of Texas showed heavy declines in working rigs from last year, and brought the state figure down to 988 from last year's 1205.

Well Completions in the United States During April, 1946, and Cumulative for Year

(Figures compiled from weekly reports of editorial men, with following exceptions: Illinois from Illinois Geological Survey; Indiana from Indiana Division of Geology except for April; Missouri from Missouri Geological Survey; Bradford and Kane-Clarendon, Pennsylvania, from the Producer's Monthly; Tennessee Division of Geology.)

State or District	MONTHLY COMPLETIONS: April, 1946									CUMULATIVE COMPLETIONS: First 4 Months									RIGS IN OPERATION					
	Details for April, 1946					Total Completions				Details, Jan.-April, 1946					Total Completions				Details for April 30, 1946			Total Drilling and Rigs Up		
	New Wells				Old Wells Deepened					New Wells				Old Wells Deepened										
	*Oil	Gas	Dry	Others[6]		April, 1946[1]	Mar., 1946[3]	April, 1945[2]	Total Footage April, 1946	*Oil	Gas	Dry	Others[6]		Jan.-April, 1946[4]	Jan.-April, 1945[5]	Percent Change	Total Footage, 4 Months 1946	Drilling	Rigs Up	Shut Down	April 30, 1946	Mar. 31, 1946	April 30, 1945
Alabama			1			1	2	2	8,521	1		5			6	6		28,598	3		2	3	4	3
Arizona			1			1			4,300			1			1			4,300	1			1	1	
Arkansas	13		4			17	8	14	64,548	33	1	21		1	56	42	+ 33.3	210,843	15		6	15	28	28
California	103	3	28		3	137	151	131	582,874	460	12	106		17	595	638	— 6.7	2,543,233	225	46	35	271	260	316
Colorado	9	1	2			12	7	4	72,050	31	1	5			37	11	+236.4	233,011	52	6	10	58	56	21
Florida			1			1	1		3,753			6			6	4	+ 50.0	40,637	7	1		8	8	6
Georgia							1	1				1			1	3	— 66.7	5,008			2			
Illinois	134		99		2	235	160	125	600,564	414	1	260	1	9	685	522	+ 31.2	1,685,162	205	29	21	234	244	173
Indiana	22	4	9			35	30	22	53,842	71	7	32		1	111	89	+ 24.7	193,847	52	14	10	66	69	37
Iowa																1								1
Kansas	66	13	42	2	6	129	157	124	419,635	353	75	187	4	24	643	471	+ 36.5	2,057,722	238	16	9	254	237	238
Kentucky	23	11	17			51	38	27	91,555	80	33	63		1	177	146	+ 21.2	324,716	45	9	7	54	54	46
Louisiana	59	8	27			94	103	88	666,710	247	31	119		1	398	310	+ 28.4	2,762,120	156	10	11	166	164	188
North	33	7	11			51	52	29	254,958	119	28	57		1	205	96	+113.5	1,004,260	68	4	6	72	78	56
South	26	1	16			43	51	59	411,752	128	3	62			193	214	— 9.8	1,757,860	88	6	5	94	86	132
Michigan	16	7	29		3	55	40	76	116,861	81	21	114		3	219	236	— 7.2	524,648	118	11	19	129	90	137
Mississippi	12	2	4			18	21	30	131,064	44	5	24		1	74	120	— 38.3	523,470	34	4	3	38	31	67
Missouri	1	1	2			4	1	5	5,433	3	2	3			8	15	— 46.7	7,958	3		4	3	4	6
Montana	18		5		1	24	11	14	53,092	52	1	19	3	3	78	63	+ 23.8	170,535	49	8	14	57	59	53
Nebraska																2			2		2	2	2	1
New Mexico	15	1	6		2	24	33	34	86,608	79	8	34		3	124	158	— 21.5	447,524	74	3	16	77	65	82
New York	70	2	4	40	1	117	79	110	173,108	211	6	5	119	1	342	311	+ 10.0	491,791	102	13	27	115	80	107
Ohio	28	35	22			85	93	69	205,764	84	160	108			352	245	+ 43.7	880,610	185	15	46	200	192	180
Oklahoma	91	17	59	2	6	175	194	178	548,371	450	70	261	9	28	818	730	+ 12.1	2,850,855	406	22	19	428	437	489
Pennsylvania	12	21	7	139	6	302	236	267	516,117	437	65	25	472	9	1,008	928	+ 8.6	1,720,246	289	40	76	329	266	292
South Dakota																			3	1	3	4	5	
Tennessee			1			1		1	912			2			2	1	+100.0	1,618	5			5	3	1
Texas	381	28	195	10	10	624	598	621	2,548,860	1,524	147	818	19	46	2,554	2,315	+ 10.3	10,875,310	940	48	104	988	940	1,205
E. Tex. Bor.	3	1	2			6	13	7	41,849	6	40	4			50	27	+ 85.2	328,738	32	4	2	36	29	32
Rest of E. Tex.	37		8		1	46	49	17	215,047	120	5	44	1	2	172	64	+168.8	905,471	61	5	12	66	57	43
North Texas	85		85	8	1	179	176	127	387,908	387	1	313	13	8	722	503	+ 43.5	1,837,817	145	3	12	148	150	139
W. Central	20	1	20		1	42	44	64	107,456	80	11	98	1	4	194	153	+ 26.8	519,714	72	2	42	74	74	71
West Texas	109	1	12	1	4	127	128	150	590,784	429	6	84	2	13	534	606	— 11.9	2,512,022	343	14	18	357	326	466
Panhandle	15	8	6		1	30	28	63	95,560	58	48	24		14	144	208	— 30.8	404,389	48	5	5	53	54	123
Upper Coast	29	10	20	1		60	53	60	407,074	132	12	86	1		231	231		1,640,372	70	4	2	74	70	98
Lower Coast	59	5	13		2	79	62	80	498,076	238	13	76		4	331	329	+ 0.6	2,127,733	115	7	3	122	116	158
Southwest	19	2	21			42	31	48	148,972	59	11	59	1	1	131	168	— 22.0	438,609	31	2	4	33	37	53
S. Central	5		8			13	14	5	56,134	15		30			45	26	+ 73.1	160,445	23	2	4	25	27	22
Utah																			4	2	2	6	6	
West Virginia	5	44	11		2	62	58	56	168,573	27	158	41		7	233	241	— 3.3	629,745	298	26	48	324	324	292
Wyoming	4	1	1			6	13	19	29,850	33	5	9			47	57	— 17.5	215,219	46	9	19	55	51	67
Total U.S.	1,199	199	577	193	42	2,210	2,035	2,018	7,152,965	4,715	809	2,269	627	155	8,575	7,665	+ 11.9	29,430,726	3,557	333	515	3,890	3,680	4,036

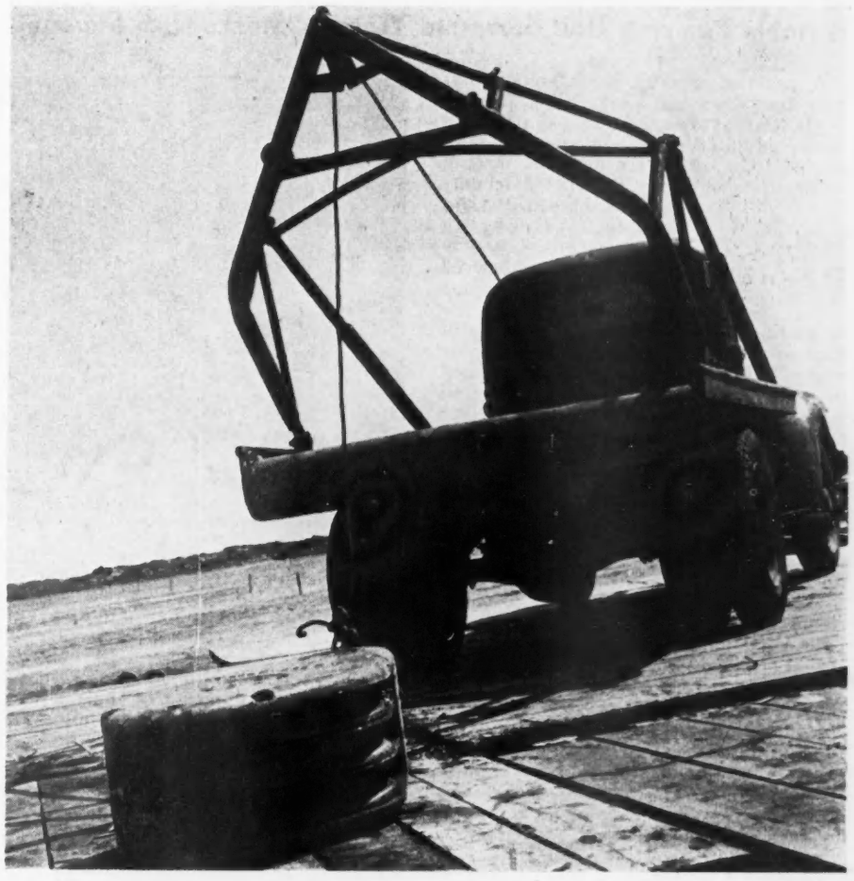
* Includes distillate wells. [1] Wells completed in 4 weeks, or 28 days, ended April 27, 1946. [2] Wells completed in 4 weeks, or 28 days, ended April 28, 1945. [3] Wells completed in 4 weeks, or 28 days, ended March 30, 1946. [4] Wells completed in 17 weeks, or 119 days, ended April 27, 1946. [5] Wells completed in 17 weeks, or 119 days ended April 28, 1945. [6] Water input, gas injection, and salt water disposal wells.

Truck Mounted Hoisting Frame

By WALTER L. RUSS

THE problem of lifting and moving heavy items of oil field equipment around the lease or storage area quickly and with a minimum of manpower is reduced by use of a unique hoisting frame. Accompanying photographs show the manner in which heavy weights can be loaded onto a truck, delivered and unloaded wherever needed by one man. The truck driver can do the entire job with this hoisting frame mounted on the bed of a 1½-ton truck with ease and a great degree of safety, and without tying up any other piece of lifting equipment.

The main legs of the "A" frame as well as the supporting arm cylinders are of three-inch pipe, while the braces and the supporting arms are of two-inch and 1¼-inch pipe. Such a hoist is simple in construction and could be assembled in any machine shop where a welding torch is available. Large springs inserted behind the two-inch supporting arms in the arm cylinders will absorb the shock when the load is lifted and carried beyond the frame's center of gravity. To unload the truck, the driver must release tension on the winch line and push the frame back to its lifting position where two pins inserted in the cylinders lock the frame securely. The winch line is then drawn in, pulling the load from the truck bed. By reversing the line, the load is lowered either to the ground or to a platform. This type hoisting equipment can be used to make "hot shot" deliveries of drill collars, core barrels, casing hammers, derrick jacks, blowout preventers and other heavy oil field equipment



Rear view showing wide-angle "A" frame in extended position, with winch line secured to heavy block ready to hoist onto the truck bed.

Winch line has been taken in to chain stop. Additional pull on winch will lift the block and pull the frame to its upright position.

The "A" frame and load have been brought to the forward point where the winch line has been reversed to lower the load to the truck bed.

Portable Pumping Unit Serves to Transfer Stocks from Storage to Main Line

A practice gaining favor among certain operators in a major California field is that of utilizing a portable, trailer-mounted shipping pump for shipping out the month's production instead of firing up a boiler for that sole purpose. Dominating factor influencing this trend is the excessive cost involved in maintaining, as well as firing, the single boiler and steam pump equipmne which it powers. During the war many boiler installations were forced to go without repairs due to labor and parts shortages, and in addition, the consumption of the natural gas used in firing them was sorely needed for other industrial uses. It was found to be more economical, therefore, to utilize a portable pump powered with a multi-cylinder engine, tying it in between the tank and the purchaser's pipe line. Oil, withdrawn from the tank through a flexible rubber hose, enters a large, easily cleaned filter mounted upstream from the pump, this step preventing the fouling of the valves by foreign matter that might have entered the tank.

STOCK TRANSFER

Connecting the high pressure side of the pump into the pipeline is an all-steel, swing-joint line of the type commonly used as rotary hoses and cementing lines. Using three of these flexible joints on two short lengths of the high pressure line, nearly any type of connection can be made made between the pump and shipping line without need of precise spotting of the pump in each set-up, it being a simple matter to support the middle joint on any handy object.

Further savings are realized by the fact that only one such pump is required for the several leases an operator may have in the area, as compared to the older method of having a boiler shipping pump at each tank battery. In the present practice, shipping-out schedules are staggered slightly to permit utilizing the portable, trailer-mounted unit at each battery.

Anywhere!

Buckeye Trenchers minimize right-of-way work. Dig in any soil. Ruggedly constructed. Faster. Readily maneuvered. Model 12 (shown) for gathering, gasoline and small natural gas lines. Models 32 or 48 for main lines. The standard trenchers for pipeline work.

BUCKEYE TRACTION DITCHER COMPANY
Findlay, Ohio
Built by Buckeye
TRENCHERS, SHOVELS, CRANES
BACKFILLERS, TRACTOR EQUIPMENT.

Conduit Permits Motor Shift Without Disconnecting

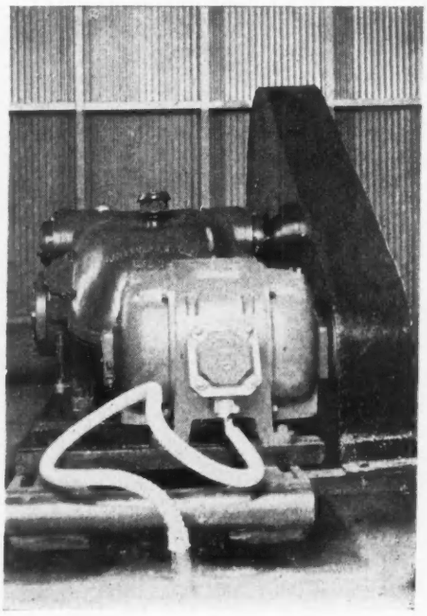
When a motor is used to power a unitized plunger pump, it usually is either mounted atop the pump case, or is set in line with it, at the power end of the same base or skid which mounts the pumping unit.

MOTOR DRIVES

Where the motor is set in line with the pumping unit, it frequently appears that the electric unit is very much in the way when servicing the pump. Even if the drive be disconnected, the amount of shifting permitted by the short power wire's conduit usually installed limits the moving which can be done without cutting the leads and, by so doing, by that amount shortening the maneuverability for the next shift.

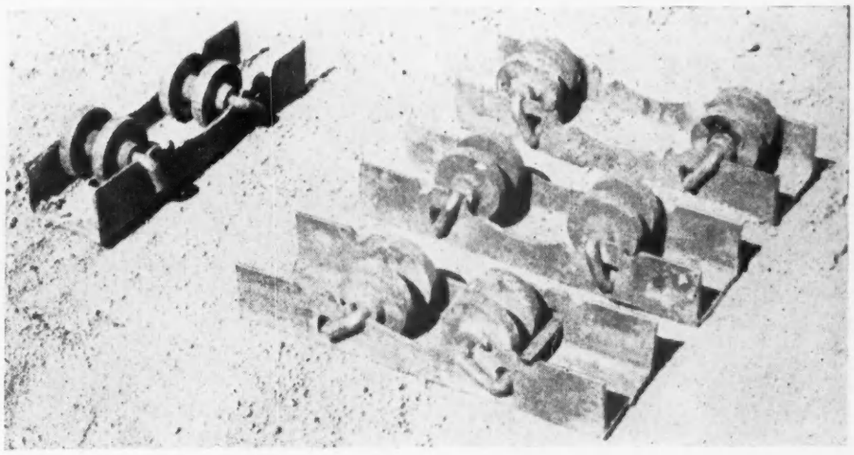
One company installs a 6-foot length of conduit and sufficient additional current leads to enable the motor unit to be disconnected from the base and set at one side of the job, far enough away to afford ample working space, and also to protect the motor, windings and bearings from possible fouling with oil in case a leak develops while working with the line—as sometimes occurs when several units are pumping into one line, and a single block gate is relied upon to hold the pressure after manifolds are cut.

With entry of the current leads through the floor at the end of the pump base, the extra length of flexible conduit may be given a slight twist, so that it will normally lie alongside the motor, and thus avoid forming a hazard, as would be the case were it allowed to loop across the floor.



PIPE LINE HINTS

Adjustable Rollers Align Pipe and Speed Welding



PIPE WELDING

An extremely useful type of roller used by pipe line welders of one company provides adjustment of width of the individual rollers to accommodate practically any size pipe that might be handled in the field. Two sets of paired 3-inch rollers are mounted on U-shaped axles assembled on short channel iron bases, the latter being of light material and measuring 15 inches long by 4 inches wide and 2½ inches deep. Three notches cut out of the sides of the channel near each roller provide for rapid adjustment of the rollers from 2- to 4½-inch radii. The axles are made of ½-inch steel rod, and are made to move up and down in 1¼-inch slots cut in the sides of the channel structure in order to permit adjustment from one set of notches to another.

The set of four units shown are ample for a length of pipe, are easily carried about, are capable of withstanding the rough usage usually accorded such equipment, and most important of all, are adaptable in a few seconds to practically any pipe diameter.

Cover Protects Meter and Chart from Weather

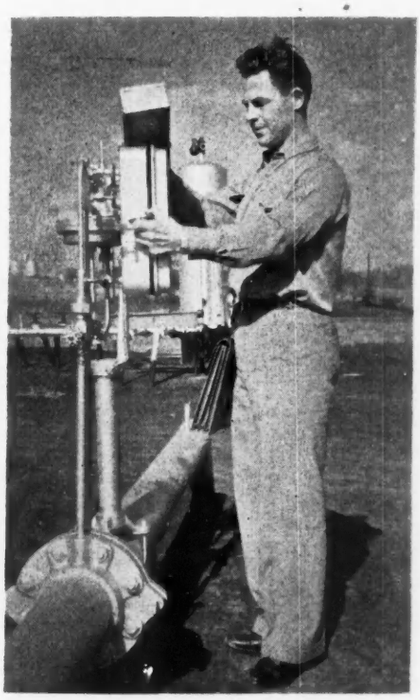


CHART CARE

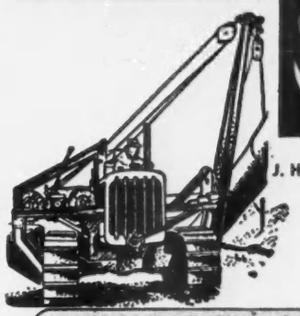
In East Texas one gasoline plant operator prevents rain water from entering meters by providing a cap which fits snugly over the top. The chart changer found that when a driving rain struck the meters from the rear, it was very difficult to prevent water from entering and spoiling the chart. The meterman constructed several caps from galvanized sheet metal, cut into strips, the sides bent down, and ends soldered in as shown.

Several of these protective devices were placed in the chart changer's car, and when he found a chart rolled, the cap was slipped on the meter which was a signal for the meterman to replace the gasket around the door. However, due to the shortage of gasket material during war time, the covers were used on all meters where the chart became damp. In the winter, it was found that the ice frozen on the meter did not prevent the raising of the hood, but that the top of the door on the meter may become coated with ice and prevent ready opening.

The cover also serves as flow-line marker when lettered with designations indicating the units connected to the line.

PIPELINE "Know-how"

J. H. (Herb) Smith
Partner



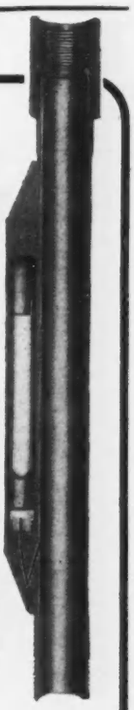
PIPE LINE CONSTRUCTION
COMPRESSORS WELDERS
DITCHERS TRUCKS
DOZERS TRACTORS

SMITH CONTRACTING COMPANY
ODESSA, TEXAS

MAIN BUSINESS OFFICE
FORT WORTH NATIONAL BANK BLDG.
FORT WORTH 2, TEXAS

—And Now!

The Halbert GAS LIFT



The Halbert Gas Lift has proved through 10 years of exacting service to be the simplest—most economical—and most trouble-free gas lift system on the market. ONLY ONE WORKING PART in the HALBERT Gas Lift. No springs, diaphragms, or trigger works to get out of order.

INSTALLATIONS

Simplicity of operation notwithstanding, the Halbert valve affords the operator a versatile gas lift system capable of varied applications. Operates efficiently, economically; with an absolute minimum of attention; and with either formation or extraneous gas. Here are some examples of applications of the Halbert Gas Lift to typical production problems.

- TO CONTROL HIGH GAS/OIL RATIOS.
- FOR WELLS PRODUCING LARGE VOLUME OF FLUID.
- FOR WELLS WITH LOW BOTTOM HOLE PRESSURE.
- PARAFFIN PREVENTATIVE.

For illustrated literature and complete information, write, wire or phone.

The HALBERT GAS LIFT
The Halbert Company

FORT WORTH, TEXAS
Telephone 3-8719 507 S. Jennings
Night Phones
Fort Worth, 4-7847 or 5-4385 Dallas, L-1720

DRILLING HINTS

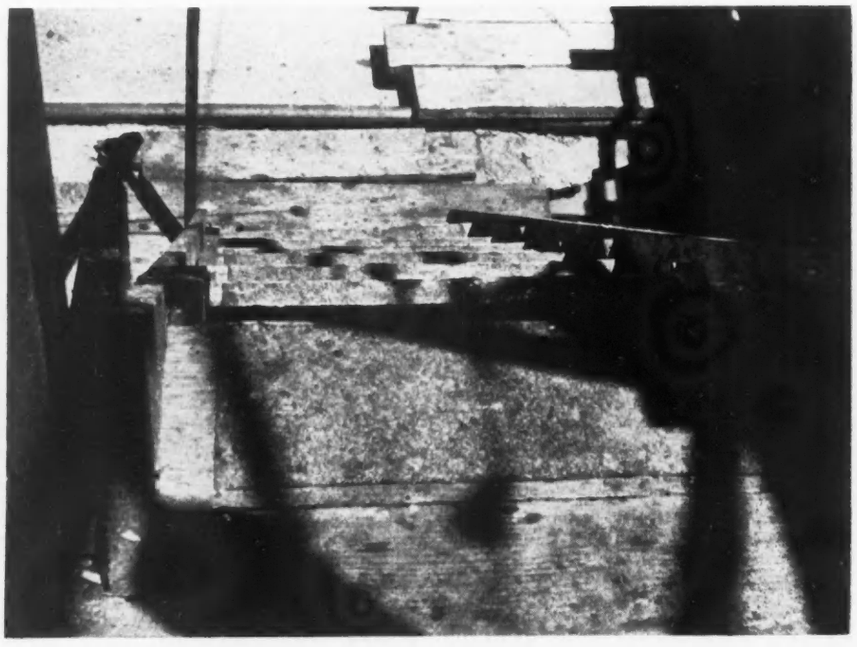
Flint Coated Roofing Paper Serves to Non-Skid and Protect Derrick Stairways

On rigs where the derrick floor is the "second floor," stairways must be constructed on two or three sides of the well. The steps are usually fouled by drilling mud or gumbo around the rig.

CREW SAFETY

Soft rope is sometimes tacked to the edge of each step to prevent accidents. One contractor uses pieces of left-over roofing material which is of the flint-coated or gravel-topped type. These pieces are cut to a size slightly smaller than the step and attached with roofing nails. The rough surface provides firm footing, and even after the gravel has worn off, the tar paper does not become slick. When the front edge has been worn through, the pieces can be replaced, or turned around if no other material is at hand.

The gravel, under service, tends to work through the paper backing, and thus to non-skid the step even under severe wear.



$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas

PENBERTHY

"REFLEX"

WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

See Pages 2450 to 2455
Complete Catalog

PENBERTHY INJECTOR CO.

DETROIT, MICH. — Canadian Plant WINDSOR, ONTARIO

Water Well Separator Eliminates Gas Hazard

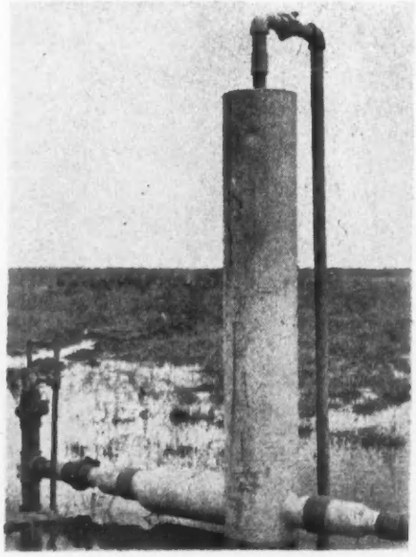
Natural gas used to jet water wells for supplying boiler water often creates a fire menace by being ejected into the air from the water flow line. One operator constructs separators near each water well to remove jet gas from the line, piping it to a point sufficiently distant from the rig so as not to constitute a hazard, while the water is conducted to the boiler water pits in the usual manner.

RIG SAFETY

Body of each separator is made of a section of casing or conductor pipe eight to 12 feet long. Both ends are sealed by welding circular plates of proper diameter. A hole is cut in the center of the upper plate suitable for welding a short two-inch nipple as a gas outlet. Bottom of the chamber is welded to a square plate of sufficient dimensions to form an adequate base for supporting the separator in upright position.

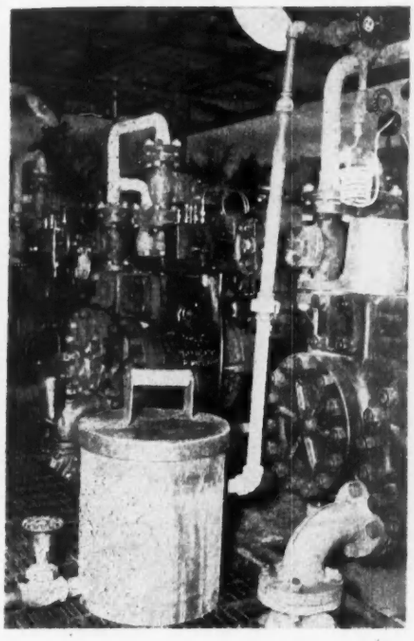
Two holes are cut through the walls of the lower portion of the cylinder for service as inlet and outlet ports for flow from the well, with the hole designed for receiving well fluids being six or eight inches in diameter, and the discharge hole somewhat smaller. To both ports, short nipples of the proper size are welded, followed by swages which reduce the pipe to the size used in the flow lines. Connections are made with the flow line near the well head to direct all flow into the separator through the large nipple, while an extension to the swage on the discharge line leads to the boiler water pit.

The discharge nipple on top of the cylinder is extended by adding two-inch pipe to conduct gas away from the immediate area, and a vertical riser is erected for venting gas into the air. Velocity of jetted water, upon reaching the expanded section of pipe prior to entering the separator, is reduced, permitting separation of gas and water, with gas rising in the chamber for egress through the vent, and water leaving through the lower port for transmittal to the pit.



DRILLING HINTS

Steam Cooker Provides Cooking Facilities



Tasty meals can be prepared in a heater which utilizes rig steam for cooking purposes. The cooker is made of two principal elements welded together into a single unit, and has a removable lid for retaining heat while food is being prepared.

CREW COMFORT

Lower section of the heater is made from a joint of large casing, cut to about 12 inches in length, with a circular plate welded to its lower end for a bottom. A cooking utensil of the desired depth, and of approximately the same diameter as the casing, is set in the top and welded, with the welds later being machined down to remove rough surfaces and to form a partitioned cylinder of uniform outside diameter. Two holes are cut into the lower section of the cylinder which serves as the heating chamber, one being located immediately below the cooking pan, and the other at a point near the bottom. A short 1-inch nipple is welded into each of the two holes.

A top for the cooker is made from a circular plate with an overhanging lip which fits snugly over the cooking pan.

Scrap Pipe Forms Sturdy Steam Line Support

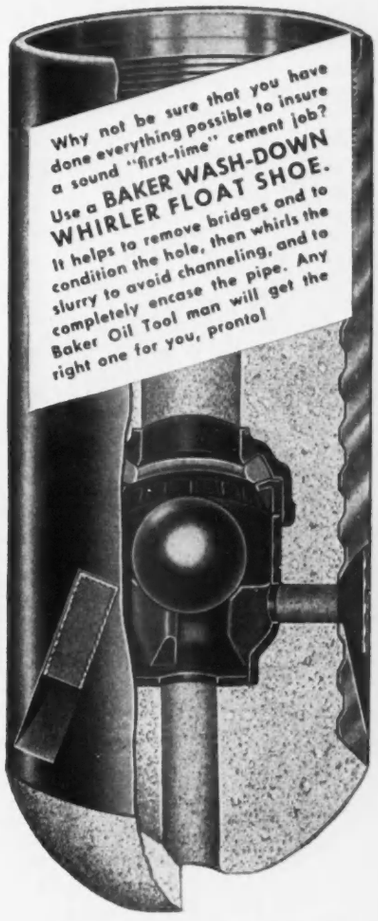
One oil company operating on the Gulf Coast utilizes scrap or salvaged pipe for constructing pipe rack supports which combine durability, facility of erection, and economy of manufacture.

DRILL PIPE

The mounts are made almost completely of worn drill pipe cut to proper lengths and welded.

Bases of the supports consist of two joints of pipe approximately three feet long, welded parallel and contiguous. At the exact center, a pipe of about the same length is welded to stand in vertical position perpendicular to the base, being braced by two diagonal pipes of smaller diameter welded to the base and to opposite walls of the upright. To the top of the upright member, a cradle is welded, made by cutting longitudinally a joint of pipe about two feet long. Axis of the cradle is at right angles to the direction of the pipe used for the base.

The pipe rack is made by placing several supporting members in position to hold a joint of drill pipe in the cradles, spaced at adequate intervals to prevent bending under the weight proposed to be carried.


Why not be sure that you have done everything possible to insure a sound "first-time" cement job?
Use a BAKER WASH-DOWN WHIRLER FLOAT SHOE.
It helps to remove bridges and to condition the hole, then whirls the slurry to avoid channeling, and to completely encase the pipe. Any Baker Oil Tool man will get the right one for you, pronto!

AIR COMPRESSORS

Westinghouse
Air Controls
Korfund
Vibration Control

Most Items in Stock

SERVICE — PARTS

"PAMCO"
POWER APPLICATION & MANUFACTURING CO.
Phone Wayside 8341
P. O. Box 9028 6640½ Harrisburg Blvd.
HOUSTON 11, TEXAS

Now One Wheel Puller Pulls All Sizes of Flywheels, Pulleys, Gears!

Simplex No. 610 Util-A-Tool, 10-tons capacity.

For fast and easy wheel pulling you can't beat the Util-A-Tool—worth more than its cost for wheel pulling jobs alone. It also pushes, spreads, clamps, straightens bent members, and lifts. Saves time, tempers and dollars whenever used.

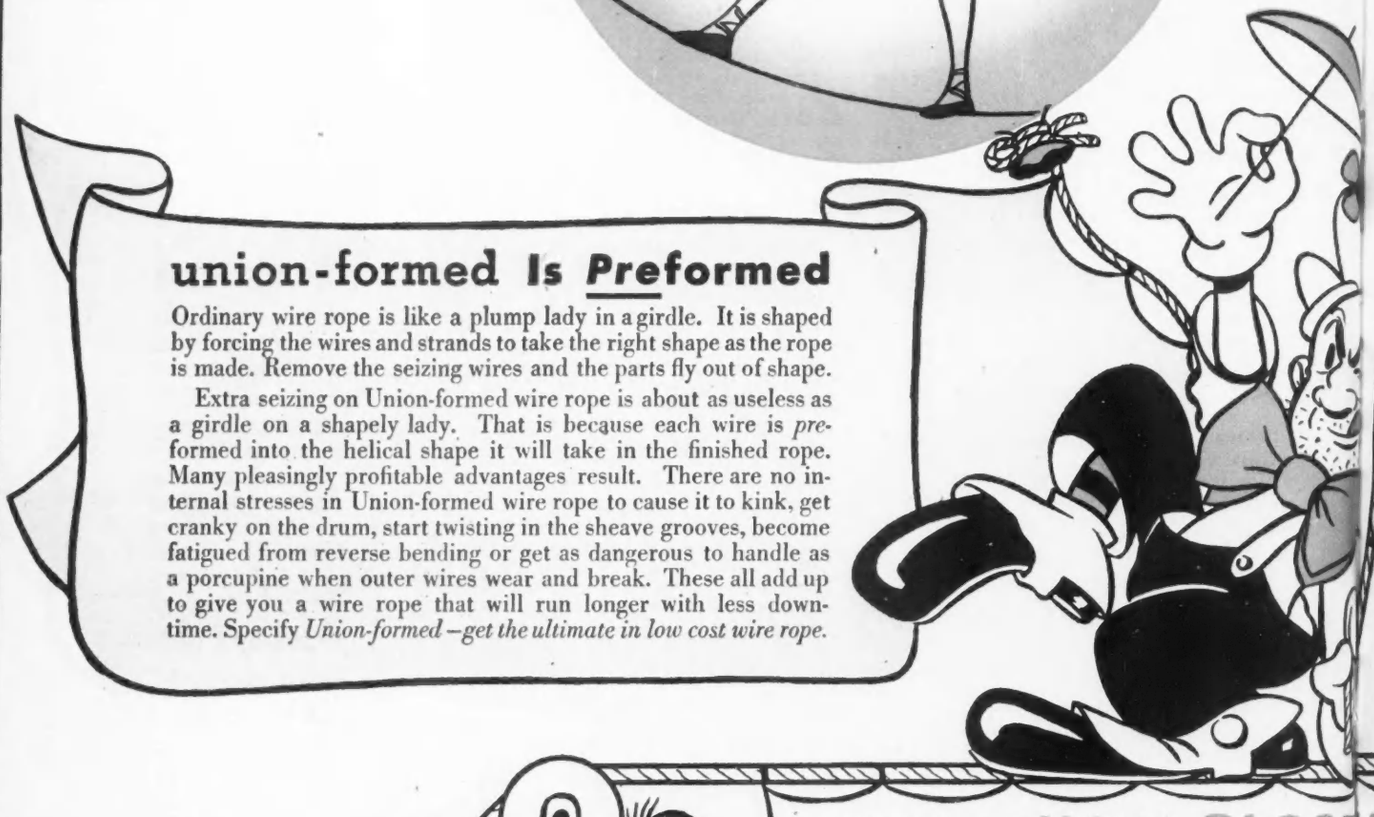
Simplex
LEVER SCREW - HYDRAULIC
Jacks

Templeton, Kenly & Co.
Chicago (44), Illinois
Better, Safer Jacks Since 1899

union-formed Is *Preformed*

Ordinary wire rope is like a plump lady in a girdle. It is shaped by forcing the wires and strands to take the right shape as the rope is made. Remove the seizing wires and the parts fly out of shape.

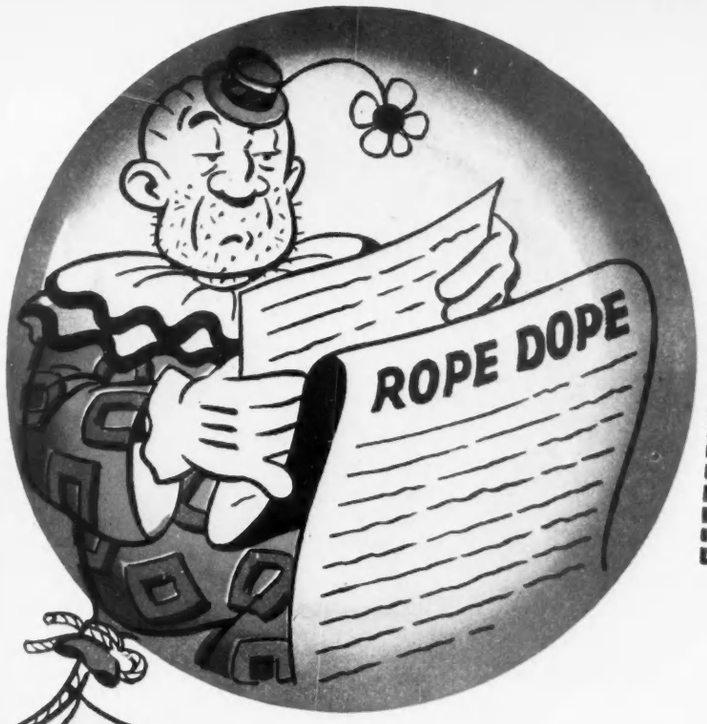
Extra seizing on Union-formed wire rope is about as useless as a girdle on a shapely lady. That is because each wire is *pre*-formed into the helical shape it will take in the finished rope. Many pleasingly profitable advantages result. There are no internal stresses in Union-formed wire rope to cause it to kink, get cranky on the drum, start twisting in the sheave grooves, become fatigued from reverse bending or get as dangerous to handle as a porcupine when outer wires wear and break. These all add up to give you a wire rope that will run longer with less down-time. Specify *Union-formed—get the ultimate in low cost wire rope.*



ROAD SHOW BIGGER

More To See Than At A 3 Ring Circus

Plans are shaping up now for the biggest ever Road Builders Show to be held early in 1947. Plan now to be there then. It will bring together the professional brains of the industry—Federal, State, County Officials — engineers, contractors and material men and the greatest display of plans and machinery ever assembled.



UNION WIRE ROPE CORPORATION
2104 **Manchester** **Kansas City 3, Missouri**

Add the undersigned to your mailing list to receive the series of 9 Rope Dope educational bulletins.

*Firm Name*_____

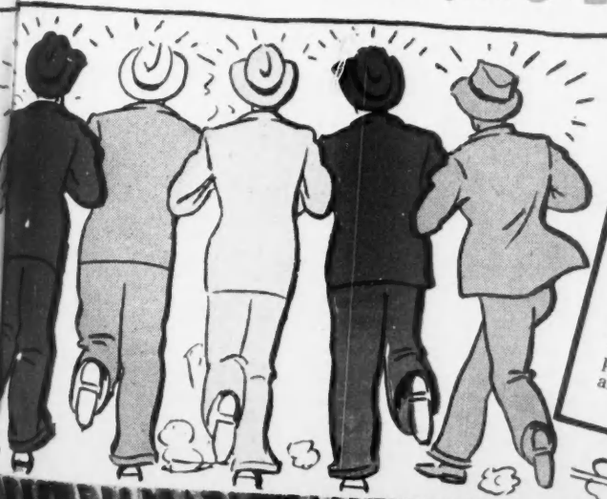
*By*_____ *Title*_____

Address _____

*City*_____ *State*_____

FREE...ROPE DOPE BULLETINS...GIVE YOU THE RIGHT DOPE ON THE SELECTION, CARE, HANDLING AND OPERATION OF YOUR WIRE ROPE—Here's a complete, easy to understand, interestingly written and illustrated course in getting the most out of your wire rope. Fill out and send the coupon above—Today. Get your name on the mailing list. The series of 9 Bulletins will be sent at frequent intervals—ALL at no cost—each will bring money-saving information. Send the coupon NOW.

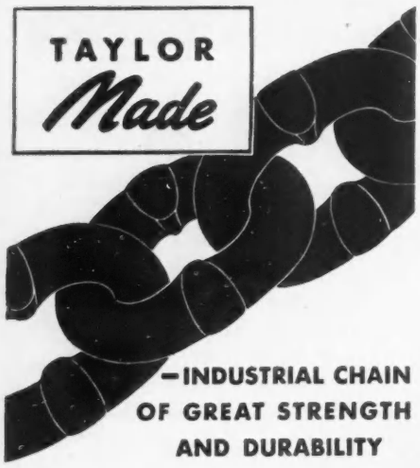
VER HELD--COMING EARLY IN 1947



Oil Industry Has Big Part in the Making of a ROAD-UNITED STATES

So much road building time and road building money have been lost during the war that extra effort should be exerted in guarding against diversion of taxes assessed for road building. The proposed secondary roads improvements will mean year around, all-weather use in transportation.

TAYLOR Made



—INDUSTRIAL CHAIN OF GREAT STRENGTH AND DURABILITY

● Where the work is heavy, and the demands of service require chain that is safe and durable, there you find Taylor Made Alloy Steel Chain used extensively. For years of experience in meeting the problems of chain buyers in many fields have enabled Taylor to develop a superior chain for every industrial use. You can cut chain costs by specifying "Taylor Made". Write for prices and information.

★ T M ★

S. C. TAYLOR CHAIN CO.

Box 509 W9, Hammond, Ind.

Proved

BY THE TEST OF TIME

RECTORSEAL has all the improvements which seven years of use by the Oil Industry has proved essential for a positive leak-preventer on threaded, gasketed, and coupled connections in lines handling all petroleum products, salt water, dilute acids, and steam up to 400 deg. F. It seals quickly, holds indefinitely, and will not freeze.

If you haven't tried RECTORSEAL recently, get a can from your supply store today.

RECTOR WELL EQUIPMENT COMPANY, Inc.

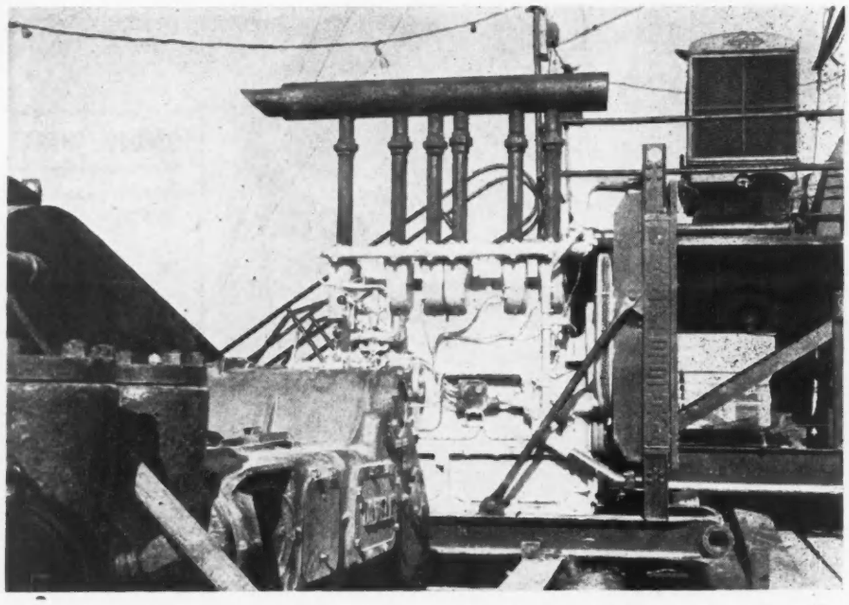
Fort Worth, Texas

Export: Lucey Export Corp., Woolworth Bldg., N.Y.C.

RECTORSEAL

THE POSITIVE LEAK PREVENTER

Removable Header Protects Engine Exhaust Ports



MUFFLER HOOK-UP

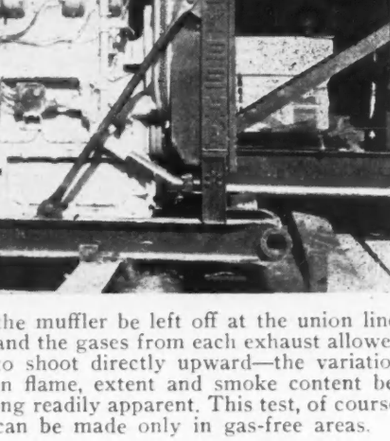
Various combinations of engines and driven units at the rig make it difficult for the engine manufacturer to provide a muffler which will meet all requirements. Frequently, to increase headroom, change the direction of the exhaust for better fire-protection, or to improve working conditions around the driven unit, the muffler must be shifted considerably from its factory-designed location.

One such change was worked out by the drilling contractor who used a 6-cylinder engine to power his mud pumps through a short V-belt drive. To raise the exhaust above the belt-drive housing, the original short risers at each exhaust port in the manifold were replaced by 18-inch pipe sections, each being equipped with a ground joint union. Atop these unions were placed the nipples which, welded into the horizontal 6-inch pipe, formed the body of the muffler. By setting the 6-inch on the risers after the unions had been pulled tight, it was possible to weld up the connection in perfect alignment, and with equal load on each of the 6 unions. The radiator end of the muffler was blanked off with a steel disc, the other end reduced in diameter with a 6x4-inch swage. The outer end of the swage was cut off at a 45 degree angle, the longest portion uppermost. This not only protected the muffler from the entry of rain, but also broke down the various exhaust impulses and reduced the noise.

When moving the engine, the 6 unions are loosened and the muffler taken off to be handled separately, in the assurance that it will again fit perfectly upon reassembly. The risers left after the muffler is removed are not heavy enough to stress the exhaust ports when the engine is shifted.

When testing the engine after an overhaul, it is possible to obtain close check on the performance of each cylinder if the muffler be left off at the union line, and the gases from each exhaust allowed to shoot directly upward—the variation in flame, extent and smoke content being readily apparent. This test, of course, can be made only in gas-free areas.

LOAD BINDERS



SMOOTH HANDLE STEEL LOAD BINDER

PAT. PENDING

MIDGET (1 swivel) ¼" chain
DELTA (1 swivel) ⅜" chain
DIXIE (2 swivels) ½" chain

MALLEABLE IRON LOAD BINDER Heat Treated

LONE STAR No 1—141 lbs. (2 swivels ⅜" and ⅝" chain
LONE STAR No. 2—16½ lbs. (2 swivels) ½" and ⅝" chain

DROP FORGED LOAD BINDER Heat Treated

No. 1—101 lbs. (2 swivels) ¾" and ⅜" chain
No. 2—17½ lbs. (2 swivels) ½" and ⅝" chain

STEEL CONSTRUCTION WIRE STRETCHERS

No. 3—3 Pulleys, plain bearings, ⅜" rope
No. 33—3 Pulleys, roller bearings, ⅜" rope
No. 4—4 Pulleys, plain bearings, ⅜" rope
No. 44—4 Pulleys, roller bearings, ⅜" rope
No. 88—4 Pulleys, roller bearings, ½" rope

DURBIN-DURCO

Manufacturers of Certified Specialties

Drop Forged and Malleable Iron

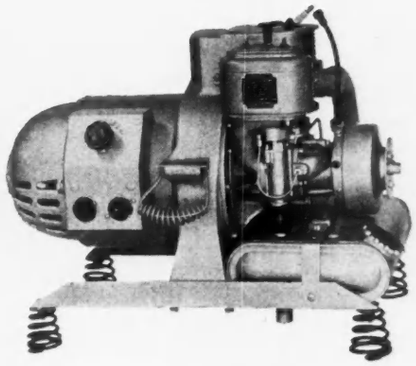
6611 OLIVE ST. ROAD — ST. LOUIS 5, MO.

NEW EQUIPMENT LITERATURE

For additional information, use mailing card inserted opposite this page

1—Generating Units

A new line of portable gasoline-engine-driven generators is offered by the Homelite Corporation. Improved designs and the use of new materials in their construction have made possible a wider



capacity range while retaining portability.

Aluminum alloys in all major castings plus the two-cycle engine design make possible the high horse-power-to-weight ratio. These generating units, both AC and DC, are available in a wide range of voltages, in frequencies from 50 cycles to 800 cycles, in sizes from 500 watts to 5000 watts. Complete radio shielding and filtering or special voltage regulation can be supplied where required.

Pictured is model 24, either AC or DC, rated at 2500 watts and weighs 105 pounds. The flywheel is equipped with fins and furnishes the necessary air to keep the air-cooled engine within operating temperatures. The unit is mounted on four springs which absorb vibration generated during engine operation. Rheostat controls mounted alongside the generator make it possible to adjust the voltage required for a specific job.

(Check item 1 on coupon for more information.)

2—Work Glove

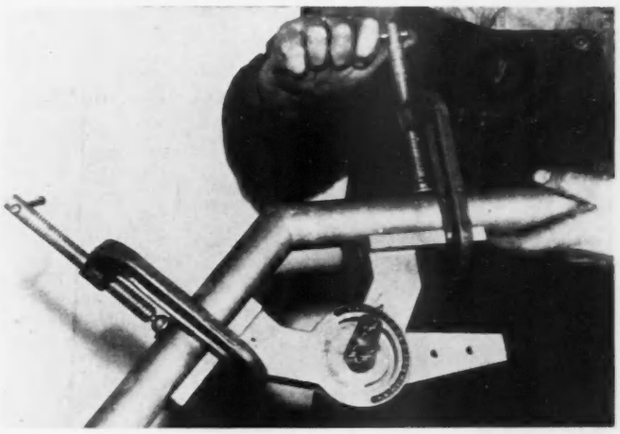
The Synthetic Division of The Pioneer Rubber Company offers a new type protective canvas work glove, impregnated with oil-and-acid resistant milled neoprene. According to the manufacturer, the milled neoprene used is tougher and more durable than the latex type, thus offering dependable protection and long wear.

The impregnating process is such that the canvas and neoprene are joined in a permanent bond and not merely coated.

(Check item 2 on coupon for more information.)

3—Holding Device

A unique holding device designed to facilitate fabrication work in welding has been announced by McFerron-Myers Products Company, Inc. Called the "Duo-Square" this device securely holds two similar or different parts of material in a predetermined alignment for welding, brazing, soldering, cementing, gluing, nailing, etc. The photograph shows the adjustable model which permits varied and accurate jointing at any angle. Two other models are available; the 90 and the straight. The 90 holds the pieces to be joined at exactly a right angle, while the straight model holds the pieces in a straight line for butt joining. Larger sizes and combinations of work holders comprising the best features of two or more of these three models will be available, according to the manufacturers.

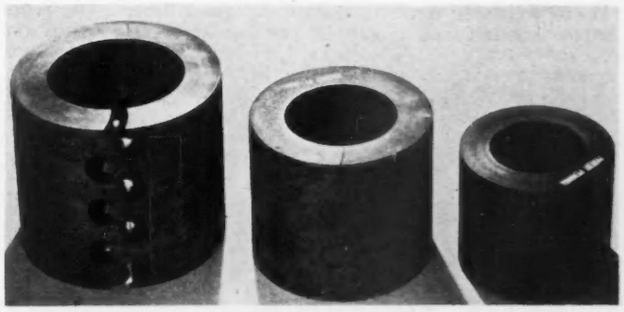


(Check item 3 on coupon for more information.)

4—Gland Packing

The new Super-lock gland packing manufactured by Supreme Oil Tool, Inc., introduces an inter-locking feature which is said to allow installation or removal of the packing without removing the piston rod.

Made of synthetic rubber especially compounded to resist oil, heat and abrasion, the packing is coated with graphite to further reduce friction and to facilitate easy removal from the stuffing box. Manufacturers claim this new packing element will reduce "down" time from approximately four hours to not more than 15 minutes, and will result in a perfect seal. The gland is available for all makes and models of pumps, and is designed for use with the pump manufacturer's junk ring.



(Check item 4 on coupon for more information.)

5—Sheave

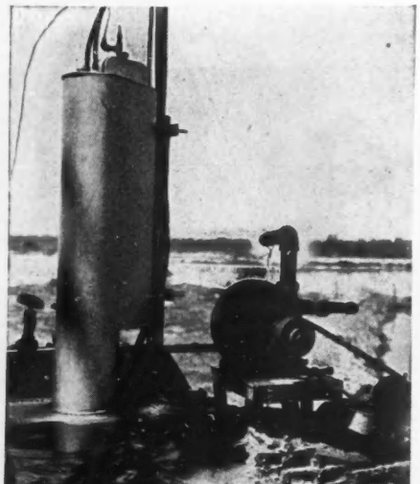
Allis-Chalmers Manufacturing Company announces a new sheave, designed for quick, easy mounting and demounting. Known as "Magic-Grip," the sheave locks to the shaft in one tightening operation. As its tapered split bushing, which accommodates normal shaft tolerances, is drawn into the sheave, the bushing and shaft are locked simultaneously.

This positive clamp fit is said to insure perfect centering and secures the sheave to give smooth performance free from back-lash and shear. The manufacturers state that the new design permits the sheave to be mounted closer to the motor and increases bearing life by reducing shaft overhang.

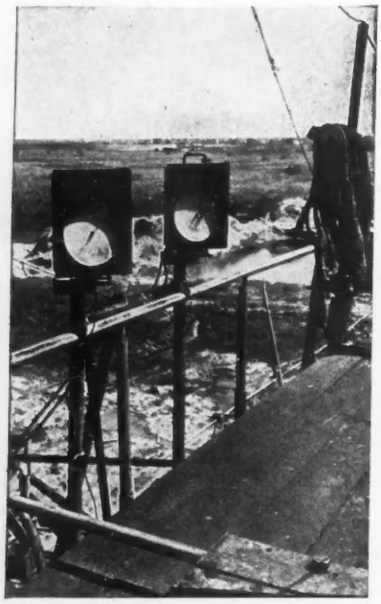
(Check item 5 on coupon for more information.)

6—Mud Measurement

The Warren Automatic Tool Company announces a simplified Mud-O-Graf to provide an automatic and continuous record of the mud weight in the circulating system of a drilling well. It



consists of a weighing unit and a recording unit, which are connected. The weighing unit may be installed at the flow line, or just ahead of the shale shaker, or at the pump suction, or at both places. The recording unit or units are placed near the driller's position. With weighing units installed at the pump suction and ahead of the shale



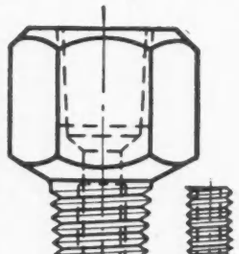
shaker, the dual record provides a comparison between "cut returns" from bottom and mud being returned to the hole.

Mud-O-Graf measures the specific gravity of mud by measuring the differential pressure between two vertically spaced points in a predetermined volume of drilling mud. Mud enters the weighing unit periodically by means of a vacuum and discharges through release of the vacuum. The time-cycle of filling, recording and dumping is approximately 1½ minutes. The 24-hour chart is calibrated in pounds per gallon or pounds per cubic foot. Manufacturers claim the improved model has no moving parts for actual weighing of mud, requires no air or gas supply, needs no water, requires no flushing, and need not be welded to the flow line coupling or discharge hose.

(Check item 6 on coupon for more information.)

7—Snubber

A new type of snubber, or pulsation dampener, has been developed by the Helicoid Gage Division of American Chain & Cable Company for use wherever pressure gages are employed. This little device utilizes powdered metal through which the pressure medium must pass. The compressed powdered metal is in the form of a cartridge which can be inserted directly in the gage socket, or in a small separate connecting piece attached to the gage socket. The compressed powdered metal is made in various porosities for air or gas, for water or steam, or for oil. It has been found that this cartridge snubber is very effective for reducing or eliminating violent pressure pulsations.

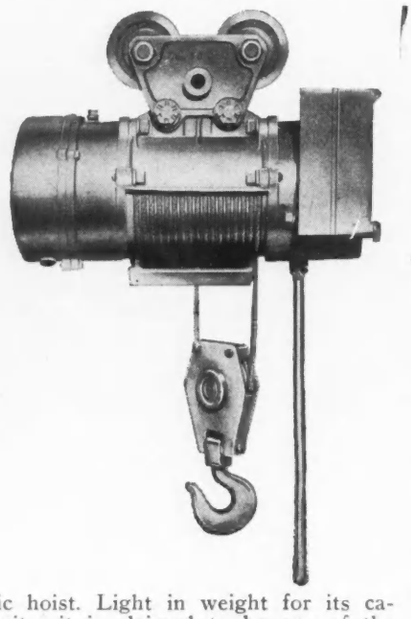


Cartridge

(Check item 7 on coupon for more information.)

8—Electric Hoist

Lisbon Hoist & Crane Company (Division of The Wright File Company) have introduced the Bob-Cat Model elec-



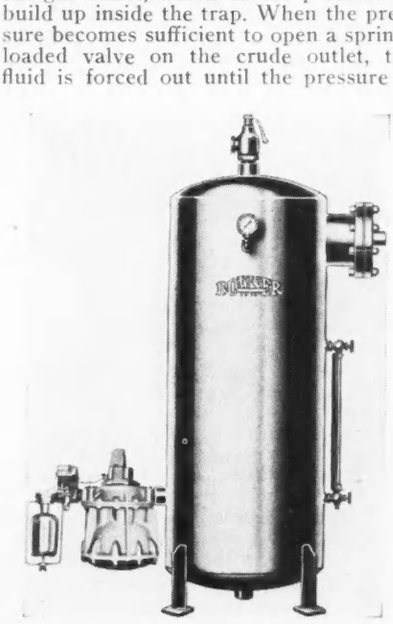
tric hoist. Light in weight for its capacity, it is claimed to be one of the smallest in overall dimensions of a standard hoist. Made in three main sections, any part is easily accessible by the removal of four bolts. Made of steel forgings and castings, it is said to have a factor of safety greater than six-to-one. Ball bearings are used throughout.

(Check item 8 on coupon for more information.)

9—Gas Traps

A series of gas traps of simplified design for separation of gas from oil in individual well installations or as central units for small lease operations has been announced by the Meter Sales Division of Bowser, Inc. A patented, positive acting, float-controlled valve of new design, operating inside the gas trap, is used instead of the conventional back-pressure regulator, oil valve and float flange.

There are no metal-to-metal seats or packing glands in the separator, and operation is said to be equally satisfactory on vacuum or on pressure. In operation, crude oil and gas enter the trap. As the liquid level rises, the float begins to close the gas outlet, which causes pressure to build up inside the trap. When the pressure becomes sufficient to open a spring-loaded valve on the crude outlet, the fluid is forced out until the pressure is



equalized. Then the liquid rises again and the procedure is repeated. The traps are built in two sizes. One has a capacity of 200 barrels of crude oil and 300 mcf of gas per 24 hours, while the other has a capacity of 500 barrels of crude oil and 1000 mcf of gas per 24 hours. Both traps will handle pressures up to 125 pounds per square inch. The pressure container dimensions are 14 inches in diameter and 40 inches in length for the smaller size, and the larger is 24 inches in diameter and 60 inches in length.

(Check item 9 on coupon for more information.)

10—Jeep

Willys-Overland Motors, Inc., is manufacturing the civilian type jeep. Since the termination of the war, the civilian jeep has been adapted to endless uses throughout industry and agriculture. Efficient in rugged terrain and built for hard work, the civilian jeep is said to be

a highly successful general purpose utility vehicle.

The civilian jeep comes equipped with four-wheel drive and several optional attachments for various types of jobs.

It has an 80-inch wheel base and utilizes the lug-grip tires which make it adaptable to field reconnaissance work. The accompanying photograph shows the jeep equipped with a 60 cfm air compressor operated from center power take-off. With the engine speed at 2600 rpm, the compressor speed is 1800 rpm. The compressor is automatically unloaded at 85 pounds pressure and governor controlled.

(Check item 10 on coupon for more information.)

11—Shaft Seal

A new development in sealing centrifugal pump shafts is now offered by Ingersoll-Rand in the form of a product known as the Cameron Shaft-Seal.

This seal is said to be the product of

more than 17 years of constant study of the problem of preventing leakage along the drive shaft of centrifugal pumps. Purely a mechanical seal, it consists of 12 individual pieces, which when assembled and installed are claimed to give efficient service when pumping hot liquids up to 350° F. under pressures as high as 400 pounds per square inch. It will handle cold liquids up to 600 pounds per square inch at the stuffing box. The Shaft-Seal is said to be easy to install on many centrifugal pumps.

(Check item 11 on coupon for more information.)

12—Compensating Axle

The Hyster Company has announced beginning of production, after more than three years of field trials and research, on the new Hyster Larison Compensating Axle. This unit, embodying eight wheels, assures equal load distribution on all tires and is especially designed for heavy-duty trailers. Each wheel is a separate entity and carries its proportionate load independent of the remaining wheels.

The unit is equipped with brakes on all wheels, which permit greater loads on steep grades, and according to the manufacturer, will result in longer tire life. The compensating axle is said to eliminate tire drag on crowned highways and on corners, giving easier load pull and lower tractor-trailer operating costs.

(Check item 12 on coupon for more information.)

Literature

13—Service Pumps

Ingersoll-Rand Company has published a 20-page, two-color catalog covering the design, construction, and engineering details of its Cameron Single-Stage general service pumps.

These pumps, embracing one type out of a number of centrifugal pump models offered by the company, are suitable for a wide variety of services wherever liquids have to be handled. Their applications include condenser circulation, air conditioning equipment, transfer service in sugar refineries, chemical plants, oil-tank farms, beverage plants, food-packing plants and many other industrial hydraulic requirements.

These single-stage units are designed for capacities to 25,000 gallons per minute, against heads up to 300 feet. They are available in several combinations of metals for a wide variety of liquids.

A number of pages of this bulletin show typical installations; several others give cross-section and interior views; another presents the various types of drive available.

Considerable space is devoted to performance and dimension tabulations, and the catalog is rounded out with the steps in the solution of a typical pumping problem. This should be a useful addition to the catalog section of many industrial libraries.

(Check item 13 on coupon for more information.)

14—Concrete Floors

Lone Star Cement Corporation has published a new booklet, "Concrete Floors with Lone Star Cements," to meet the problem of renewing industrial flooring. Foresight and care in construction mean wear resistance, durability, and long-time economy, both in new construction and in floor resurfacing. Common construction faults are pointed out, and specifications are recommended for heavy-duty floors. A special section is devoted to floors with "Incor" 24-hour cement, showing how floors can be replaced over a single week-end.

(Check item 14 on coupon for more information.)

15—Rotary, Pumping Equipment

International Derrick & Equipment Company has published two bulletins on oil field equipment. Bulletin R-45 is an 11-page standard size booklet describing and illustrating the improved oil-bath rotary. All popular sizes of rotaries are fully covered with a phantom view of the rotary given in cross section. Included in the bulletin is Ideco's direct-driven rotary unit and the new Ideco roller-kelly drive.

Bulletin P-45 contains illustrative information of the company's line of geared pumping equipment. Individual parts views are shown in retouched photographs and a series of views shown in the manufacturing process of the herringbone gears used throughout the pumping gear reduction boxes.

(Check item 15 on coupon for more information.)

16—Valves

Alloy Steel Products Company, Inc., has published two bulletins containing descriptive material on its corrosion-resistant valves. Procedures in the manufacture of these high chrome-nickel alloy valves are briefly presented, and photographs show steps in the process. Technical information bulletin No. 2 describes Aloyco-20, a corrosion-resistant alloy used in the manufacture of valves for handling corrosive fluids and mixtures. It considers the development of the alloy, applications of the alloy in processing plants, advantages, and gives both an analysis and the mechanical properties of the metal. Cross section views of gate, globe, check, angle, and port valves are shown as applications of the alloy.

(Check item 16 on coupon for more information.)

U. S. Companies Indicate Interest In Renewing Exploration in Italy

Indicating interest in possible expansion of crude reserves in Italy, American companies are taking preliminary steps to renew exploration work.

First company to start any type of negotiations to renew work is the Societa Petrolifera Italian, in which Standard Oil Company (New Jersey) holds a substantial minority interest. Opening moves have been in the way of a series of conversations leading up to petitions to the Italian government to allow continuation of prewar prospecting. It apparently was not expected that any assurance would be given soon by the government, but the opening moves would serve as a basis for negotiations once the government has been so stabilized as to be in a position to make commitments.

Big Strikes Unlikely

Although there is reported to be a considerable amount of territory in Italy classified as "favorable oil country," it is not thought that any great amount of new oil is likely to be discovered. However, enough oil should be uncovered to pay out a reasonable investment.

Societa Petrolifera Italian controls about half the country's 100,000-barrel annual output of crude which would have to be materially increased to justify any further capital expenditure on top of the $5 million already invested.

Standard obtained some concessions through its purchase of stock in the SPI in 1926, but one disadvantage of the present system is that concessions no larger than about 5000 acres can be obtained. Part of the preliminary petitions to the government concern possibility of increasing the size of tracts to justify extensive prospecting.

Exploration work interrupted by the war is said to have located a number of structures of diversified nature and origin, which is indicative of possible discovery of oil to supply a much greater percentage of the country's needs. The present production is a negligible portion of the total domestic demand, which was about 23 million barrels in 1939, the last "normal" year.

Most Promising Areas

Most favorable oil areas are the Emila region in the northern part of the country which now accounts for 90 percent of the nation's output, the Pescara Valley of the central Appennines, the Lucanina area in the southern Appennines, Tuscany in southern Italy, and Sicily.

Oil was discovered in Italy in 1860, just a year after the Drake discovery in Pennsylvania, but cumulative production to the end of 1945 was only about 3½ million barrels, or about 13 percent of a normal year's demand.

Regardless of the interest shown by American companies in Italy as a scene of oil exploration, a stable monetary system will have to be established before the companies will freely spend dollars in search for oil in Italy or other European countries.

DAN L. CLARK W. M. AVERILL RUPERT COX

DAN L. CLARK
DRILLING CO.

Drillers of

OIL AND GAS WELLS

POWER AND STEAM RIGS

NIXON BUILDING

CORPUS CHRISTI, TEXAS

Local 7746-7747 Long Distance 95

Sinai Peninsula Field Opened By Anglo-Egyptian Company

Anglo-Egyptian Oilfields, Ltd., has opened an oil field on the Siani Peninsula, east of the Suez Canal, and 40 miles south of Suez. On the basis of a short pumping test of formation between 2680 and 2925 feet, the company's SUDR 1 was shown capable of producing approximately 275 barrels of 22-gravity oil daily. Lacking complete information at this time, it is assumed that the well is producing from one of the Cretaceous formations known to be productive at Hurghada field to the southwest, although at slightly greater depth.

Early reports had been given to the effect that the well found showings at approximately 2700 feet, but since the latter part of March, the well drilled to a total depth of 3157 feet before plugging back to 2925 feet for the production test which established it as a discovery. It was still testing at latest report.

Anglo-Egyptian Oilfields' SUDR 1 is on a concession being developed for joint account with Socony-Vacuum Oil Company, but operated by the former. The same operators had drilled two dry holes on a prospect nine miles southeast of Suez recently, completing one in July, 1945, at 5451 feet, and a 5808-foot dry hole in the same area completed in January of this year.

Daily Production in Mexican Fields Gains During February

Petroleum production in the Poza Rica, Naranjos, and Panuco fields of Mexico during February amounted to 3,030,183 barrels, compared with 3,037,724 barrels in January, *The Foreign Commerce Weekly* reports. However, the daily average production increased from 97,991 barrels in January to 108,228 barrels in the 28-day month of February.

Stocks in the fields and at terminals in the northern zone totaled 3,998,415 barrels February 28, against 3,992,929 barrels January 31.

Iceland to Use Oil Equipment In Drilling for Hot Water

Rigs designed for drilling deep oil wells will be obtained in the U. S. to search for hot water in Iceland.

Reykjavik, capital of Iceland, is almost entirely heated by hot water, which is piped in from flowing wells. Recognizing the possibility that these wells may decrease in volume, the State Electricity Control is engaged in a large-scale drilling venture.

There are no known oil deposits in Iceland.

Roma Survey Planned

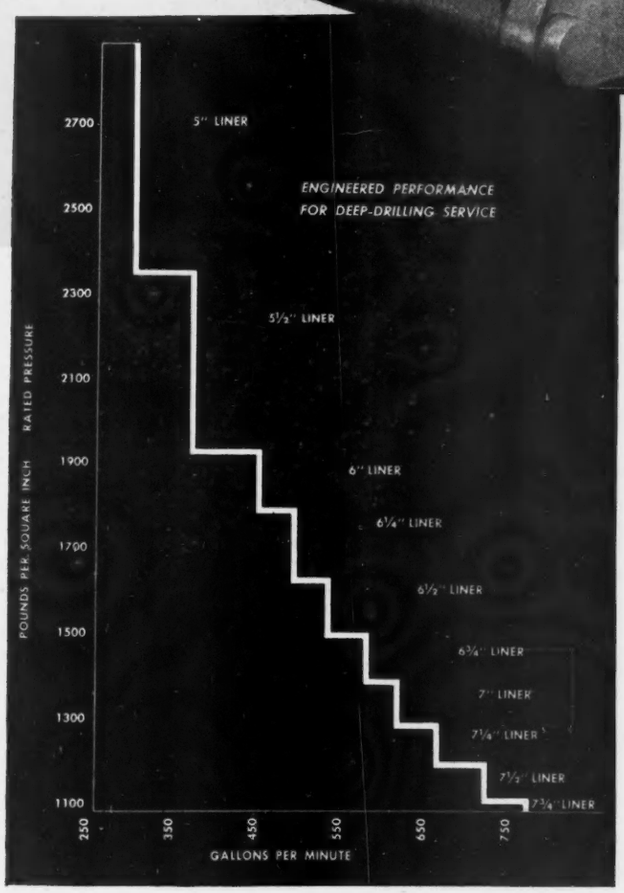
The companies which still have interests in the Roma oil field, Australia, including Roma Oil, Roma North and Roma Blocks, have combined to secure the services of an expert to make a comprehensive survey of the field with view of resuming oil operations. The expert has not been named. The Roma area was the scene of much activity several years ago when gas was discovered.

It's Got the Guts

FOR DEEPEST DRILLING

BETHLEHEM

G-600 POWER PUMP



A 600-HORSE PUSH

Maintains high circulation rates 'way down the hole

Lessens bit expense

Cuts down drilling time

Eliminates dangerous compounding

BETHLEHEM SUPPLY COMPANY

SUBSIDIARY OF BETHLEHEM STEEL CORPORATION

BETHLEHEM STEEL

Crude Output and Runs to Stills Reach Highs for Year; Gasoline Stocks Low

Crude production and crude runs to stills hit new highs for the year while gasoline stocks were dropping to a new low level during the week ended May 11.

Production of gasoline and distillate fuel oil was up over the previous week's but the output of residual fuel was cut back considerably. Residual stocks continued to gain despite the slackening of production, as additions of over a million barrels were made to the combined stocks of the light and heavy fuel oils. These trends were revealed by the latest weekly report of The American Petroleum Institute.

Crude oil production in the United States averaged 4,749,000 barrels daily during the week and topped the year's previous high of 4,726,000 barrels produced daily during the last week of February. This week's output was an increase of 28,000 barrels per day over last week's but missed by 111,000 barrels, or 2.4 percent, of matching the daily production of the comparable week of 1945.

Crude runs averaging 4,820,000 barrels daily were made to refinery stills during the week to establish a new high for the year. The previous high for daily crude runs was 4,789,000 barrels made during the week ended April 20. This new high failed to equal the runs made during the corresponding week of last year by 67,000 barrels a day.

Stocks of refinable crude were reported by the U. S. Bureau of Mines to be 221,911,000 barrels on May 4, after having been reduced 2,532,000 barrels during the preceding seven day period. These stocks were 892,000 barrels more than were held May 5 of last year.

Production of gasoline, including natural blends at refineries, totaled 13,903,000 barrels for the week, which is 14,000 barrels over the previous week's output, but 1,338,000 barrels, or 8.8 percent, under the like week of last year. Stocks of finished and unfinished gasoline dropped to a new year's low of 98,158,000 barrels, a decrease of 390,000 barrels during the week, but 9,738,000 barrels, or 11.0 percent, over the 88,420,000 barrel inventory of May 12, 1945. The previous 1946 gasoline stocks low was 98,494,000 barrels on January 5.

Distillate fuel oil output amounted to 5,422,000 barrels for the week, a step-up of 109,000 barrels over the previous week, and 539,000 barrels over the comparable week a year ago. Distillate stocks increased 249,000 barrels during the week and now stand at 31,736,000 barrels, which is 2,250,000 barrels, or 7.6 percent, more than was on hand one year before.

Residual fuel oil production dropped to 8,724,000 barrels for the week, a decrease of 286,000 barrels from last week's output and 650,000 barrels, or 6.9 percent, from last year's week. Stocks of residual fuel accumulated 796,000 barrels during the seven days and now total 41,008,000 barrels.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum. Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11–22	4,120	10–18	266,187	3–29	99,727	3–29	[1]54,983	11–15	102,448	1– 4
1942	4,337	2– 7	3,961	1– 3	263,208	3–28	[1]109,281	3–14	47,861	11–14	95,857	1– 8
1943	4,436	11–13	4,331	12– 4	245,752	5–29	94,159	3–20	47,187	11–27	72,881	1– 2
1944	4,762	9–30	4,798	12–30	240,992	1– 1	89,162	4– 1	48,162	10–28	64,744	10– 7
1945	[1]4,944	7–14	[1]5,140	8–18	227,554	10–13	99,012	3–24	45,341	11–17	56,074	1– 6
1946	4,749	5–11	4,820	5–11	229,430	3– 2	105,233	2–16	35,199	1– 5	42,371	1– 5
Lows:												
1939	[2]1,601	8–26	3,125	2–18	[2]229,127	10–12	71,152	10– 7	20,722	4–15	105,397	4– 3
1941	3,364	1–11	3,490	1–18	240,399	11–15	79,923	10– 4	28,382	4–12	90,914	7–13
1942	3,297	7– 4	3,393	5–23	231,896	12–12	75,934	12– 5	29,240	4–25	72,962	12–26
1943	3,821	1– 9	3,579	3–18	232,191	1– 9	68,182	10–16	30,732	4– 3	57,596	12–25
1944	4,357	1– 1	4,228	2–12	220,258	9– 9	76,302	1– 1	30,232	4–19	49,737	3–18
1945	3,621	10– 6	3,409	10– 6	[4]211,813	8–25	70,791	10–13	26,483	3–17	38,548	5–26
1946	4,403	3– 9	4,498	1–12	218,193	1– 5	98,158	5–11	25,131	3– 9	37,289	4– 6

TRENDS OF 1945 AND 1946

Trends in Week Ended	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1945:									
January 27	4,727	4,756	221,310	14,957	88,223	4,843	33,561	9,252	51,119
February	4,777	4,803	219,351	15,500	95,972	4,958	28,753	9,084	46,713
March 31	4,781	4,677	223,782	14,644	98,758	4,548	26,889	9,184	41,745
April 28	4,805	4,780	223,474	14,633	94,068	4,636	28,273	9,379	39,813
May 26	4,887	4,950	222,831	15,194	89,121	4,667	29,184	9,670	38,548
June 30	4,903	4,999	220,781	15,546	86,472	4,910	32,213	9,077	40,488
July 28	4,930	4,996	218,507	16,106	86,008	4,598	36,071	9,586	42,283
August 25	4,982	4,931	[4]211,813	15,986	84,693	4,960	39,782	9,356	46,201
September 29	4,357	3,812	222,387	11,913	79,552	3,940	43,689	7,047	46,853
October 27	4,273	4,838	224,230	15,530	74,335	5,159	43,472	8,691	45,943
November 24	4,469	4,648	219,363	15,681	83,184	4,802	45,258	8,800	47,474
December 29	4,474	4,729	218,918	14,546	95,205	5,055	36,651	8,765	42,447
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,293	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,357	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 4, 1946	4,721	4,672	221,911	13,889	98,548	5,313	31,487	9,010	40,212
May 11 1946	4,749	4,820	.....	13,903	98,158	5,422	31,736	8,724	41,008
May 12, 1945	4,860	4,887	[5]221,019	15,241	88,420	4,883	29,486	9,374	39,116
Change:									
In Week	+28	+148	−2,532	+14	−390	+109	+249	−286	+796
In Year	−111	−67	+892	−1,338	+9,738	+539	+2,250	−650	+1,892
In Year	−2.4%	−1.4%	+0.4%	−8.8%	+11.0%	+11.0%	+7.6%	−6.9%	+4.8%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922 due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, May 5, 1945.

Commission Offers Tank Barges At Fixed Prices

The Maritime Commission has announced that some 100 tank barges previously offered for sale by competitive bidding will be sold at fixed prices, about half of them, with a cubic capacity of 8060 barrels, at $3150 each and the remainder, with a capacity of 8580 barrels, at $3500 each. All of the barges are tied up at Madisonville, La.

Similarly, some 40 DPC inland tank barges previously advertised under invitations to bid will be sold at $9000 each. Originally dry cargo carriers, the barges were converted to tank service by Defense Plant Corporation in 1943. They have a cubic capacity of approximately 16,000 barrels and are equipped with piping systems for loading and unloading, but have no heating coils or cargo pumps.

Alabama-Mississippi Chart

A report and chart of geologic cross sections of the Midway and Wilcox stratigraphy in Alabama and Mississippi, designed to show possibilities for bauxite production but declared also to be of value to the oil and gas industry in the East Gulf Coastal Plain, has been released by the U.S. Geological Survey.

The chart, titled Preliminary Report 3-195 of the Strategic Minerals Investigations series, can be had at 50 cents a copy from the Survey in Washington.

Texas Panhandle to Denver Line Is Planned by Phillips

Plans for a 360-mile products pipe line from the Texas Panhandle direct to Denver at a cost of about $5 million were announced by Phillips Petroleum Company and the Shamrock Oil & Gas Company. The line will connect the Phillips refinery at Phillips with the Shamrock plant at McKee, and will extend northwestward into Colorado with terminals at LaJunta and Denver. The companies will own the line jointly, with Phillips in charge of construction and operations.

Capacity of the 6⅝-inch pipe will be 5500 barrels of oil daily, but may be stepped up to 15,000 barrels daily with the addition of pump stations.

Aviation gasoline will comprise a substantial portion of the Phillips shipments.

Great Lakes Begins Work on 500-Mile Midwest Extension

Construction has started on the 500-mile extension of the Great Lakes Pipe Line Company system in North and South Dakota.

Work includes 200 miles of 8-inch and 300 miles of 6-inch pipe line north of Sioux Falls, S. D., and construction of new distributing terminals at Watertown, S. D., Marshall, Willmar, Alexandria and Mankato, Minn., and Fargo and Grand Forks, N. D.

The company recently completed 400 miles of eight-inch line between Barnsdall, Okla., and Kansas City, Kansas, between Omaha, Nebr., and Siox Falls.

Shipments of West Texas Crude To Gulf Coast Are Increased

Tank car shipments of West Texas sour crude to Gulf Coast plants have been stepped up to 37,400 barrels daily as a result of Humble Oil & Refining Company shipments of 15,000 barrels daily to its Baytown refinery. The company is supplying the Eastern States Petroleum Company's Houston refinery with 22,400 barrels daily during May. This oil is loaded at a rack near Midland.

Line from Baxterville Field, Mississippi, Is Planned

Gulf Refining Company plans an oil pipe line from the Baxterville field, Lamar County, Mississippi, to Lumberton. The line probably will be about 12 to 14 miles in length.

Ohio Plans Gathering System For Gas Delivery to T-G-T

The Ohio Oil Company has contracted to sell gas from two fully-owned fields in South Texas to the Tennessee Gas Transmission Company, and will build a gathering system and discharge line from each to connect with the buyer's 24-inch carrier.

Eleven miles of six-inch will be built from the Orange Hill field, Austin County, connecting with the carrier near Wallis. The outlet for the Nada field, Colorado County, will consist of 7½ miles of line, connecting with the 24-inch between Nada and El Campo.

Line to Be Reconditioned

Bishop & Lock Construction Company, Dallas, Texas, has been awarded contract to recondition eight and ten-inch lines between Normangee and Richards, in Central Texas, by Magnolia Pipe Line Company.

Shell Installs Two-Way Radio System on West Texas Line

Shell Pipe Line Corporation is installing a two-way radio communication service instead of the customary telephone lines on its 23-mile, eight-inch trunk line from Bedford field, Andrews County sector of West Texas, to its Wheeler station. The system will consist of four units, with central stations at Bedford and Wheeler, while portable units will be mounted on the maintenance truck and gauger's car.

Did you ever stop to consider that one thread in each sucker rod joint carries up to 80% of the load? Maybe that explains more clearly the painstaking care required in machining and threading.

That is why Jones strict standards demand precision threading to accurate and smooth API specifications. A big battery of automatic machines does the job. They are another Jones "first." And, it doesn't stop there. The pin shoulder face is accurately machined-smooth and uniformly square with the axis of the coupling which is also machined to the same close tolerances. A perfect fit is assured every time. Every thread meshes smoothly and tightly.

As a result, joints are easier to make-up. Stay made up when correctly snapped up at the well. Strings last longer... carry heavier loads... prevent avoidable failures.

NEW JONES "SNAP-TITE" *wrench for faster ... safer ... tighter ... longer lasting joints. Extra balanced make-up torque. Extra "wallop" in bucking up. Plus ... many superior features. Now available in standard jaw sizes. 12", 14", 16", 19" handles. 4⅝, 6½⅝, 7⅞, 10⅝. Ask your distributor or our salesman. In the meantime, write for your copy of the new "SNAP-TITE" Pamphlet.*

THE S. M. JONES COMPANY

(Subsidiary of Buffalo Bolt Company)

General Office and Factory: Toledo, Ohio Sales Office: McBirney Bldg., Tulsa, Okla.
Export Sales Office: Buffalo International Corp., 50 Church St., New York, N. Y.

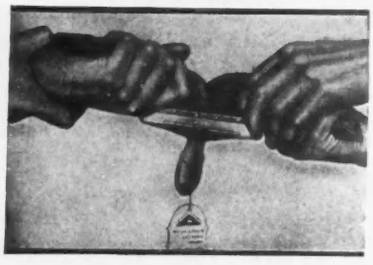
PURE BRISTLE

Paint Brushes

ONE TO FIVE INCHES

WELL STOCKED

WELL MADE



AVAILABLE NOW

Write or Call for Sizes and Prices.

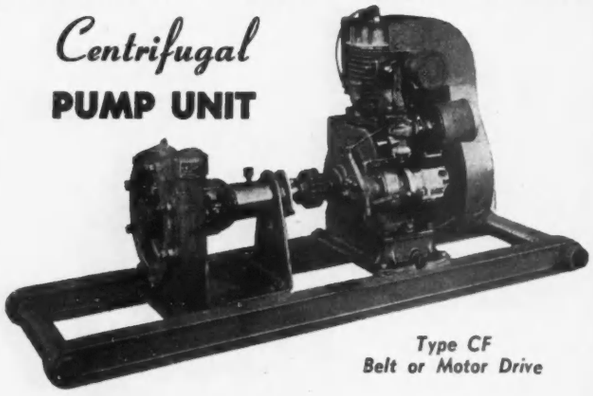
PAINT-POINT PRODUCTS CO., INC.

99 S. 6th Street, Brooklyn 11, N. Y. STagg 2-4560

LOCKETT-WORTHINGTON

Centrifugal

PUMP UNIT



Type CF
Belt or Motor Drive

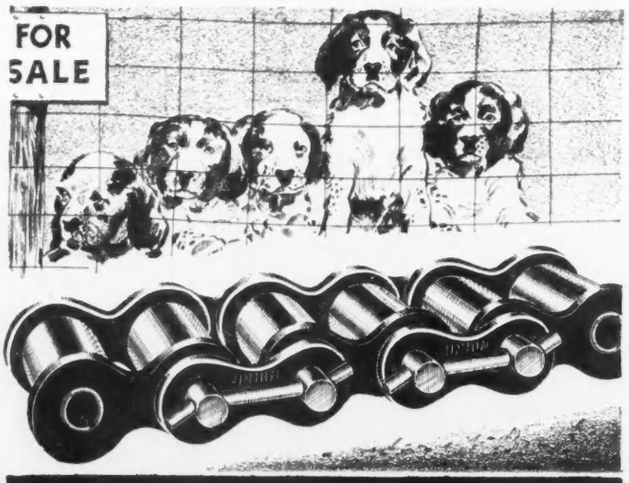
NO MATTER what your pumping problem may be, Lockett Dealers — from warehouses located at, or near, the principal oil fields of Texas and Louisiana, and backed by a large replenishing stock at our Houston and New Orleans Warehouses — can supply complete pumping units for every pumping need.

Lockett Dealers can promptly furnish dependable Worthington Pumps, adapted for use with any type or make of power unit — gas, gasoline, Diesel, or electric motor; and, also *genuine* Worthington Repair Parts from near-by warehouse stock.

Today, as heretofore, your best assurance of getting years of efficient, uninterrupted pumping service is to buy your pump needs from a Lockett Dealer.

A. M. LOCKETT & COMPANY, LTD.

NEW ORLEANS HOUSTON DALLAS



When You Have A Choice, Choose Union

☆ Picking the right pup out of a litter is often a matter of good fortune, but don't trust to luck when you select Oil Field Chain.

The odds will be in your favor if you buy Union Oil Field Chains for they are made by an organization of chain specialists who are always trying to build chains which will give you longer and more efficient service. Specify Union Chain on your next order and compare its performance with your past experience. Chances are, you will choose Union regularly thereafter.

The Union Chain and Manufacturing Company
Sandusky, Ohio, U.S.A.

Union Oil Field Chain for Every Application

A. P. I. No. 3⅛ P Union *Superintendent* No. 3125-R
A. P. I. No. 3⅛ P Union *Superintendent* No. D-3125-R
A. P. I. No. 4 P Union *Jumbo* No. 1240-SXX
A. P. I. No. 4 P Union *Toolpusher* No. 1240-RXX
A. P. I. No. 4 P Union *Driller* No. 1240-R 4
A. P. I. No. 4 C Union *Roughneck* No. 1240-RX
A. P. I. No. 3 P Union *Toolpusher* No. 1190-RXX
A. P. I. No. 3 P Union *Driller* No. 1190-R 3
A. P. I. No. 3 C Union *Roughneck* No. 1190-RXS

★

Finished Steel Roller Chains and Sprockets
All manufacturer's standard sizes ⅜ in. to 2½ in. pitch in single and multiple strands.

Flexible Couplings
Roller Chain type
Silent Chain type

Oil Field Chain Export Sales
E. F. GAHAN
500 Fifth Ave., New York 18, N.Y.

Union Bulletin O-1 covers Oil Field Chain. Ask for your copy.

ARMY NAVY

UNION CHAINS

☆ Oklahoma

Leases on 97 Tracts of School Lands Are Acquired by Gulf

Gulf acquires leases on 97 tracts of school land in Beaver County; old Brock field of Carter County gets new pay horizon; Cotton County discovery starts drilling campaign; Carter's McClain County pool opener fills tanks; GI Joe pool in Osage County in fast development; Wewoka Lake area of Seminole County extended; Cruce gas pool gets flowing oil well.

Beaver County: Gulf Oil Corporation has increased its leaseholds in western Beaver County to an estimated 115,000 acres by acquiring 97 tracts of state-owned lands. Gulf bid from $2.12 to $7.60 per acre for its spread, which was mostly fill-in acreage. Several months ago Gulf bought a reported 100,000 acres of leases in the area. The acreage is east of the Hugoton-Guymon gas field.

Carter County: The old Brock field has an edge well showing good production from a deeper producing horizon. W. F. Turner's George 1, SW SW NW 17-5s-1e, was getting 6 barrels of oil an hour from a new oil zone logged at 1950-2560 feet, with pipe perforated in a series of sands. Brock field has 127 wells yielding a total of 218 barrels of oil daily with pay from Pennsylvanian sand at 1100 feet. The field was discovered by Amerada Petroleum Corporation in 1922 and recovery from the field has been in excess of 3,880,000 barrels.

Cotton County: Bridwell Oil Company's Houghton 1, SE NW NW 23-3s-11w, wildcat 7 miles southwest of Walters, tested an estimated 40 barrels of oil daily to start a development program. Production is from a sand at 1490-98 feet, total depth. The Houghton 2, SW NW NW Sect. 23, had the sand at 1480-1505 feet and was testing. Other wells in the area are in the process of testing.

McClain County: The Carter Oil Company's Thompson 1, C NE SE 36-8n-4w, east of Blanchard, flowed between 75 and 100 barrels of oil an hour from perforations at 9970-10,035 feet in the Chimney Hill zone of the Hunton lime and then was shut down because tanks were full. The new pool opener had gas-oil ratio of 1010/1 with no water. Tubing pressure ranged between 450 and 500 pounds.

Osage County: The GI Joe pool is experiencing fast development with The Ohio Oil Company bringing in the best well discovered so far. Osage 1, SW SE SE 12-22n-11e, tested 258 barrels of oil in 7 hours from the Burgess sand at 1635-40 feet, total depth. Virgil Greenwood, discoverer of the field, has completed 2 wells and has spudded the third. Ohio has staked its second well in the pool.

Seminole County: Kingery and Patterson's Landowners Royalty 1, NE NE NE 23-8n-7e, extended the Wewoka Lake area of central Seminole County when it tested 3 barrels of oil an hour during first tests. With the Booch sand topped at 3164 feet, pipe was set to 3145 feet and total depth is 3200 feet. Operators shot with 80 quarts and will test further.

Stephens County: The old North Cruce gas pool has an oiler at T. H. McCasland's Payne 1, SW SE SE 19-1n-5w, which flowed 260 barrels in 8 hours. Total depth is 2940 feet with 7-inch pipe set at 2923 feet.

Warren Petroleum Purchases Hanlon Companies' Stock

W. K. Warren, president, announced the consummation of the purchase by Warren Petroleum Corporation of all of the outstanding capital stock of the oil companies known as the Hanlon companies, effective May 1.

Consideration was not officially announced, but was reported to have been approximately $12 million.

Indian Lands Offered

Sealed bids for oil and gas mining leases on restricted lands of members of the Five Civilized Tribes will be received in the office of A. M. Landman, superintendent, Muskogee, Okla., until June 11. A total of 5518.24 acres in 14 various Oklahoma counties will be offered.

☆ Kansas

Stafford County Pool Opened; Marjorie Pool Given Gasser

Pool opened in Stafford County by Cities Service; Marjorie pool gets big gasser; Crowther pool test makes potential of 635 barrels; Ellsworth County test given state potential of 809 barrels; abandoned gasser still out of control in Reno County; new wildcat situated on seismograph high in Rush County; testing of Saline County test indicates opening of oil pool.

Stafford County: Cities Service Oil Company has opened an oil pool at Kipp 1, NE NE NE 23-25-14w, northwest of the McAndless pool. The hole filled with oil when operators perforated pipe at 3844-63 feet opposite the Lansing. Tools were taken below 4200 feet before perforations were made.

Barber County: The south end of the Marjorie pool has been given a 19,200,000-cubic-foot gas well by Phillips Petroleum Company at Marjorie 4, CNW SW 1-31-14w. With the Maquoketa pay formation topped at 4414 feet, the plug was cracked at 4418 feet. The formation

Wells Completed in the United States in Week Ended May 18, 1946

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second or third issue of each month. More detailed data on wildcats published in third or fourth issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†In-put	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama													6	8
Arizona													1	
Arkansas	1				1				2	2	3	1	65	58
California	26	4		1	31	6			4	4	41	30	699	779
Colorado												1	44	11
Florida							1			1	1		8	6
Georgia													1	3
Illinois	31			17	48	2	1		5	6	56	67	845	612
Indiana	2	1		5	8				1	1	9	13	140	106
Iowa														1
Kansas	22	7	2	11	42	3	2			2	47	39	765	570
Kentucky	2	1			3			1	3	4	7	7	205	168
Louisiana	20	4		2	26			1	7	8	34	36	497	366
North Louisiana	12	4		1	17			1	6	7	24	16	492	114
South Louisiana	8			1	9				1	1	10	20	239	252
Michigan	6			5	11		1	1	5	7	18	12	259	280
Mississippi	5			1	6						6	2	86	142
Missouri													10	15
Montana												1	81	70
Nebraska														2
New Mexico	2			1	3	1			1	1	5	7	142	179
New York	15		10		25						25	25	417	369
Ohio	1	2		2	5						5	11	378	301
Oklahoma	23	1		14	38	3			3	3	44	46	941	864
Pennsylvania	28		15	2	45	1					46	47	1,146	1,077
Tennessee													2	1
Texas	95	9		16	120	1	7		27	34	155	171	3,033	2,724
E.Tex.Bor. Co.'s		4			4						4	7	63	30
Rest of E. Texas	9			1	10				1	1	11	12	206	77
North Texas	27			10	37	1	3		14	17	55	49	878	605
W. Central Tex.	1	1		3	5				2	2	7	12	226	175
West Texas	33				33		2		2	4	37	30	630	719
Tex. Panhandl	1	1			2						2	9	160	231
G. Coast, Upper	5	1		1	7						7	16	263	272
G. Coast, Lower	15				15		2		4	6	21	26	400	390
Southwest Texas	4	2			6				3	3	9	6	152	193
S. Central Tex.				1	1				1	1	2	4	55	32
Utah													2	
West Virginia	1	13		3	17	1					18	10	276	285
Wyoming												2	55	58
Total U.S.	280	42	27	80	429	18	12	3	58	73	520	528	10,104	9,055

* Includes distillate wells. † Includes salt water disposal wells.

was treated with 2000 gallons of acid during operations.

McPherson County: Westgate-Greenland Oil Company's Pisel 4, SW SW 26-17s-1w, Crowther pool, was completed for a potential of 635 barrels of oil daily from chat at 2753 feet.

Ellsworth County: Nelson Drilling Company's Jansen 3, CSL SE NE 21-17-8w, Edwards pool, was given a state potential of 809 barrels of oil daily from the Arbuckle at 3186-3233 feet, following acid treatment.

Reno County: The abandoned oil well on the F. L. Reece farm in the southwest part of the county is still out of control. The gasser blew in when a salvage crew dynamited the pipe from the old oil well, indicating a possible new gas field. Workers were able to deflect spraying salt water which had been damaging crops over a wide area around the well, but efforts to case it in have failed.

Rush County: A new wildcat test, situated on a location that one of the operators termed "a seismograph high," is the Hildebrande-Watson and Keyes Drilling Companies' Dwyer 1, SWc SE 1-19-16w, 2½ miles southwest of Albert, on a block of 1120 acres. Drilling operations are now under way. On a farmout deal from Stanolind Oil & Gas Company, this well is supported by Sinclair Prairie Oil Company.

Saline County: Testing of the L. Walker and others' Haag 1, wildcat in NW SE SW 32-14-2w, 2 miles southeast of Salina pool, indicated a new oil pool. In a 24-hour pump test from the Viola lime at 3246 feet, the well produced 150 barrels of fluid, 30 percent water, and 70 percent oil.

☆ Rocky Mountain Area

Major Gas Field Is Opened by Deepest Rocky Mountain Well

Already noted for its record depth of 12,895 feet, the deepest ever drilled in the Rocky Mountain region, the Church Buttes Unit 1 in Uinta County, Wyo., has opened what appears to be one of the region's major gas fields. The well is a joint operation of the Mountain Fuel Supply Company (Ohio Oil Company subsidiary) and the Union Pacific railroad, on a 50,000-acre unitized block in Uinta and Sweetwater counties, in the extreme southwestern corner of Wyoming.

The well was completed at 2 levels in the Dakota sand, from 12,550-606 feet, and 12,640-674 feet.

With bottom-hole pressure of approximately 6500 pounds per square inch, and surface pressure of 5600 pounds, freezing presented a problem that has delayed testing production. Heating equipment now is being installed, after which testing will be resumed.

Reports from the well, not yet official, state that gas production is estimated at 50 million cubic feet a day, with a flow of approximately 500 barrels of 46-gravity oil a day.

Location for the No. 2 well is 5 miles from the No. 1 and the rig is being moved to the new spot.

Nomads Induct

The Los Angeles Chapter of Nomads inducted C. S. Meece, John C. Mason, Edwin Ross and Ronald C. Smith as new members. W. A. Wilson was inducted as an associate member.

☆ New Mexico

Lea County Wildcat Is Failure; Brunson Deep Area Extended

Lea County has wildcat failure; seventh well in Brunson field producing from 135 feet of effective pay; deep explorations expand to north.

Lea County: Amerada Petroleum Corporation's Hooper 1, C NW NE 27-19s-35e, wildcat, was abandoned at 3500 feet, having entered the Yates at 3390 feet, or 72 feet high to a previous test by the company on its large block.

Repollo Oil Company's Brunson 4, SW SE 4-22s-37e, and twin to a regular Permian producer, extended the Brunson deep area ¼ mile north with natural flow of 173 barrels of oil on 4-hour test through tubing choke from perforations at 7735-7870 feet. This production is from Ellenburger, topped at 7630 feet, and granite wash, or detrital, topped at 7850 feet.

Amerada is starting deepening operations on Hare 1, C NW SE 33-21s-37e, which was completed at 3748 feet by Twin Oil Company and is now depleted. It will try for Glorietta production, but if unsuccessful will continue to the Ellenburger. It is southwest of Eunice townsite, and 1⅜ miles northwest of Ellenburger production.

Well Damage Charged

A complaint filed with the Oklahoma Corporation Commission by Frank Buttram, Oklahoma City independent operator, charged the Midstates Oil Company with damaging of wells in the South Carnegie field of Kiowa County. The complaint contends Midstates deepened its Hoodlegizone 3 to the Viola lime to get salt water, which was not properly shut off, and which has contaminated the three producers on the Buttram lease.

☆ West Texas

Ector Discovery Is Permian Basin's 14th Devonian Strike

Western Ector County discovery is 14th Devonian strike for Permian Basin; Winkler County wildcat has good showing in Clear Fork; Reeves County deep prospect making hole without appreciable change.

Ector County: John W. Murchison et al's T.P. Land Trust-Texaco 1, C SE NW T&P Ry. 7, Block 45, T-2-S, 3½ miles south by west of the TXL field and 6 miles southeast of the Wheeler field, uncovered a new oil area in flowing through testing tool at 8564 feet, and will land pipe to complete. The Devonian was entered at 8510 feet, with elevation of 3070 feet, and drill-stem test at 8564 feet yielded gas to surface within 5 minutes. The well flowed 5 barrels of 39-40-gravity oil the last 20 minutes, thus assuring the county its third Devonian producing area, and the 14th for the district.

The discovery is on 160-acre site farmed out by The Texas Company that will expire October 11, unless productive. Other leases in the area will not require development for some time. Top of the Devonian correlates 982 feet low to nearest Devonian producer in the TXL field, and 111 feet low to nearest well, an Ellenburger producer, in the Wheeler field. Geological markers and intervals between markers are comparably close to the Wheeler field, which registered a sharp dip to the south and southeast, thus discounting possibility of the new strike being an extension to the latter. Murchison et al will start a second test in the southeast part of the same section.

Texas' T.P. Land Trust 1-F, 2 miles north of the TXL field, was drilling lime at 8815 feet on Ellenburger objective after enhancing its outlook through the recovery of oil, gas and salt water when tester was used at 8580-8620 feet. This showing was from the Silurian, topped at 8590 feet, or 86 feet high to a nearby faiure.

Stanolind Oil & Gas Company et al's Kayser Unit 1, 1¼ miles southwest of the Foster field, was drilling at 11,550 feet in Devonian, topped at 11,390 feet. A drill-stem test at 11,413-11,544 feet yielded 190 feet of gas-cut mud. Cities Service Oil Company's Parker-Wentz 1, ¾ mile southwest of the Harper field, was drilling at 11,245 feet, or 100 feet in the barren Silurian.

Andrews County: Union Oil Company's Cowden 2, north offset to the Dollar Hide field discovery, and the highest of 3 producers, flowed at a rate of 60 barrels of oil hourly, with gas volume estimated at 1½ million cubic feet daily, when tester was used at 7700-7804 feet. Pipe was cemented at 7606 feet to complete through open hole. The Devonian was entered at 7611 feet, or 170 feet high to the discovery. Magnolia Petroleum Company's Cowden 1-B, ⅞-mile northeast outpost, recovered 360 feet of oil and gas-cut mud when tester was used in Basal Permian at 7450-7540 feet, and was drilling at 7610 feet. Humble Oil & Refining Company's Cowden 1, 11/16 mile southeast of the discovery, had not reached the Devonian in drilling at 9590 feet. It is possible that the Dollar Hide area will be small.

The Atlantic Refining & Company et al's University-Texu 1-A, C SE NE Sect. 9, Block 12, had been abandoned at old total depth of 10,760 feet after unsuccessful tests of the Devonian and Permian. Atlantic's University 1-B, 1-1/16 miles southeast, was then temporarily halted at 4965 feet, but Texas is due to take over and deepen because of having nearby leases.

Fullerton Oil Company's Wilson 342-A, ½ mile east of its Ellenburger discovery for the Fullerton field, flowed 56 barrels of 43-gravity oil the first hour and dropped at 25 barrels the fifth hour when tester was used in Wolfcamp (Basal Permian) at 7948-8059 feet. This zone was not tested by the deep producer. Drilling was resumed to explore deeper zones.

Winkler County: Hunt Oil Company's Hill-Gulf 1, SWc SE PSL 9, Block B-11, and 1⅝ miles east of the Weiner field, resumed coring at 6202 feet after 2 drill-stem tests of the Clear Fork indicated probable production from broken saturation between 6103-6202 feet. A drill-stem test at 6103-50 feet yielded 190 feet of heavy oil and gas-cut mud, while a test at 6106-6202 feet made a better showing without water. Hill 1 was originally abandoned by Gulf Oil Corporation at 4170 feet, and was turned over to Hunt for deepening to 8000 feet. Tide Water Associated Oil Company con-

with MISSION PISTONS

it's Change the Rubbers and Save the Piston

CUTS UPKEEP COSTS IN HALF

Unconditionally Guaranteed

. . . to be perfect in material and workmanship and to be the most economical piston on the market to operate.

The Mission principle of replaceable rubbers on a long-lasting body **saves money** formerly invested in continually buying new bodies. Mission rubbers are extremely long-lasting and trouble-free and are replaceable on the derrick floor without removing piston from rod.

Life of liners and pistons increased . . . because the Mission design of more rubber and less metal gives far greater wiping surface, eliminating by-passing.

★

It's Mission Pistons the world over, because with Mission it's "Change the rubbers and save the piston." Specify Mission.

Mission Manufacturing Co.

HOUSTON TEXAS

EXPORT OFFICE: Room 1636, 30 Rockefeller Plaza, New York 20, N.Y.

SOLD THROUGH SUPPLY STORES EVERYWHERE

MISSION SLUSH PUMP VALVES . . . MISSION FLUID END PISTONS . . . MISSION PISTON RODS . . . MISSION SLIPS . . . MISSION GLAND PACKINGS . . . MISSION SWABS . . . MISSION PLUG VALVES

tributed acreage and a $17,500 dry-hole letter, while Sid Richardson gave an $8500 dry-hole contribution and acreage.

Stanolind and Westbrook-Thompson Holding Corporation's Hendrick 35-A, C SW SE PSL 33, Block 26, initial deep test for the Hendrick field, was drilling lime and chert at 11,145 feet in Devonian, topped at 11,010 feet, being the lowest for the county. A drill-stem test at 11,094 feet returned nominal show of gas with rotary fluid.

Sutton County: Shell Oil Company's Wilson 1, C NW SE TW&NG Ry. 38, Block B-14, 20 miles south by west of a wildcat gasser, nearest production, was showing in excess of 2 million cubic feet of gas with considerable water from Pennsylvanian perforations at 4190-4220 feet. This wildcat was plugged back from salt water in the Cambrian at 6170 feet, having entered barren Ellenburger at 4792 feet, with elevation of 2233 feet.

Hudspeth County: Albert R. Jones et al's Mowry 1, NE SE T&P Ry. 36, Block 70, and near center of an 18,678-acre block, plugged back from 4519 feet in barren Ellenburger, topped at 4132 feet, and reset 6⅝-inch pipe at 3136 feet to test nominal showings in the Devonian, topped at 2969 feet. This isolated wildcat entered the Silurian at 3067 feet and the Montoya (First Ordovician) at 3926 feet.

Reeves County: Argo Oil Corporation's Dora Roberts 1, C NW SE H&GN Ry. Block 13, which has precipitated a major lease play in the southeastern sector of the county, on the strength of brief oil flows through drill pipe from the Basal Permian, was coring lime and shale at 10,810 feet. The showings have been nominal below 10,729 feet, where the wildcat headed oil through drill pipe.

Midland County: Humble's Crespi 1, ¾ mile northwest of its Midland pool discovery in the 11,390-foot Pennsylvanian, was drilling dry lime at 11,570 feet. A fair show of gas resulted from 2 drill-stem tests of the Devonian, topped at 11,416 feet, or about flat with the discovery.

Gaines County: Argo Oil Corporation's Jones 1-E, a mile east of the Jones Ranch field discovery well, was drilling at 10,810 feet, and correlating low. Amerada Petroleum Corporation's Jones 1-B, ½-mile west outpost and indicated third producer, appeared to have water shutoff in plugging back to 11,395 feet, and will perforate from top of the Devonian at 11,342 feet down to this level. A small oil producer with water was possible from perforations at 11,405-420 feet.

Sterling County: R. R. Herrell et al's T.P. Land Trust 1, C E½ SE NW T&P Ry. 1, Block 31, T-5-S, cemented pipe on bottom at 2325 feet, and will fulfill contract at 2750 feet before testing nominal saturation at 1928-40 feet. This wildcat entered the San Andres at 1720 feet, with elevation of 2567 feet.

Property Returned

Original landowners of the 520-acre auxiliary airport used by the Navy in 28-10n-3w, between the West Moore and South Moore fields in northern Cleveland County, Oklahoma, were returned their property by the surplus property board recently. Landowners have negotiated leases with oil on the three tracts and it is understood that the government sold the property to former owners for the condemnation price, plus cost of improvement.

☆ Central West Texas

Shackelford County Wildcat Heads Oil from Bend Lime

Shackelford County wildcat heads oil from the Bend, while county's new Ellenburger pool has second disappointment.

Shackelford County: Roeser-Pendleton, Inc.'s T. W. Lee-Shell 1-B, C NE NW T&P Ry. 27, Block 11, 3 miles southwest of Albany and between shallow pools, opened a new Bend lime area in flowing oil by heads. The Bend was entered at 4413 feet, with elevation of 1629 feet, and the well filled rapidly with oil in drilling a saturated zone at 4463-69 feet with cable tools. It is bottomed at 4472 feet, and headed oil until killed to cement 7-inch pipe on top of the pay. The company has a supporting block of 1200 acres obtained from Shell Oil Company, which retained an equal amount of checkerboard acreage.

Phillips Petroleum Company's Hickman-Nellen 1, northeast offset to its prolific Ellenburger discovery for the Sedgwick area, plugged back from 4310 feet to 3900 feet to try for an oil completion in the Marble Falls sand at 3936-50 feet after failing in the Ellenburger, topped at 4236 feet, or 19 feet low. A drill-stem test at 4238-51 feet proved dry, and 1400 feet of salt water were recovered at 4248-4310 feet. R. H. Roark-Hooker & Douglas' Hickman 1-A, 1775 feet southwest of the discovery and 15 feet low on the Ellenburger, tested small amount of oil with water after 2-stage acid treatment of open hole at 4227-34 feet. This open hole has since been squeezed with cement, and will be partially drilled out to try for water shutoff.

☆ North Texas

Western Knox County Wildcat Flows Oil on Preliminary Test

Western Knox County wildcat flows oil on preliminary test; shallow discoveries noted in Archer and Young counties; Montague County prospect has gas show.

Knox County: Cities Service Oil Company's Mulkey 1, C NW NW H&TC Ry. 163, Block 44, 2 miles south of Truscott and 16¾ miles northeast of nearest production, flowed oil by heads on preliminary test of Basal Pennsylvanian at 6225-40 feet. Operations were suspended to move in swabbing truck to condition the well for acidizing. This isolated wildcat had indicated production at the above level before deepening to Ellenburger, topped at 6718 feet and drilled to 6785 feet. The Mississipian, topped at 6360 feet, proved dry. This is the first producer for the county.

Archer County: Smiley-Norwood Drilling Company's Harris 1, Block 71, J. W. Harris subdivision and 7 miles northwest of Anarene, pumped 45 barrels initial from broken sand at 1122-26 feet, with the hole bottomed in shale at 1135 feet. Two offsets have been authorized. Nearby dry holes will materially restrict the productive area.

Young County: P. T. Timberlake and H. M. Kelleher's Bryant-Rose & Hamilton 1, Sect. 3401, TE&L Co. Survey and a mile south by west of production, pumped 15 barrels initial from sand at 948-52 feet, with the hole bottomed at 954 feet. An offset drilled by the partnership was abandoned as dry at 970 feet.

Montague County: Dave Bennett and J. W. Sorrells' Milton 1, Sect. 13, recovered gas-cut mud when tester was used at 6125-38 feet and again at 6206-20 feet. Drilling was resumed. This wildcat is contracted to test the Ellenburger.

Youngblood and Forec's Woods 1, Lot 41, W. J. Wells Survey and ¼ mile west outpost for the Rogers & Rogers field, flowed 66 barrels the first hour and 72 barrels the second on natural test through ¾-inch choke from Bend lime at 5322-34 feet. This completion reveals that the trend of production to the west is open.

Grayson County: Standard Oil Company of Texas' Mitchell 1, northwest edge of Sherman, was running protection string of 9⅝-inch casing at 8177 feet to deepen to Ellenburger. Drilling information released reveals numerous nominal to fair shows of oil in the Strawn series from 4296-5807 feet. The most effective zones of saturation and porosity will be tested through perforations if the pre-Strawn beds are nonproductive.

Cooke County: Sun Oil Company and Standard's Midkiff-Davis 1, Sol Gann Survey and 1⅓ miles east by north of the Ellenburger oil discovery for the Sivels Bend field, was awaiting orders in dry Ellenburger at 9050 feet.

Dual Completion Problems Study Continued in Texas

Problems surrounding dual completions, which the Texas Railroad Commission has declined to permit in the Bonnie View field of Refugio County, were discussed at a recent hearing.

Previously evidence had shown that there are loose, unconsolidated sands which, under high pressures, cut connections and had seriously damaged one well. The Commission at that time denied an application for a dual completion and in addition, ordered closed two wells which had been completed in this manner.

At last week's hearing, two new suggestions for controlling wells were offered by E. V. Foran, United Producing Company. Automatic controlled equipment could be installed on the wells so that production from the wing valve of the tubing would pass through a safety valve and thence through the first choke, then through a sand trap and then through a secondary choke to the lease tank. In the event the first choke failed, the safety valve would be closed automatically when pressure beneath the diaphragm of the valve was released.

To prevent sand from coming through the well, the operators proposed to use a new plastic material. This would assist in consolidating the loose sands around the well bore and prevent their circulation with the gas as it is produced.

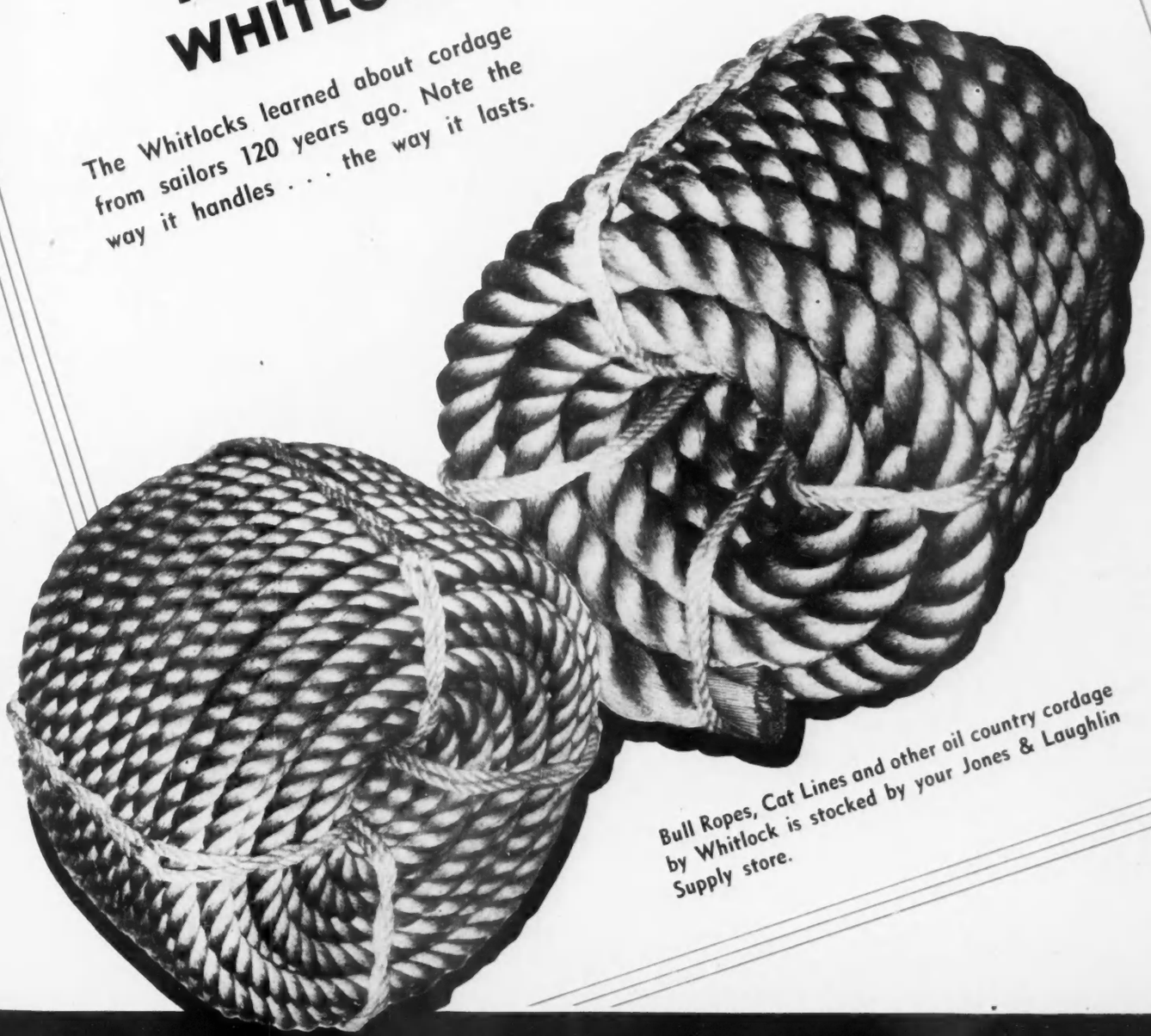
United also contended that use of dual completions permitted drainage of small sand stringers to which it would be uneconomical to drill a well.

Recently the commission has been scrutinizing each proposed dual com-

When you order ROPE say WHITLOCK

"Rope" can mean anything. WHITLOCK means quality.

The Whitlocks learned about cordage from sailors 120 years ago. Note the way it handles . . . the way it lasts.



Bull Ropes, Cat Lines and other oil country cordage by Whitlock is stocked by your Jones & Laughlin Supply store.

JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary of Jones & Laughlin Steel Corporation

J&L STEEL

TULSA, OKLAHOMA

pletion and it now has under consideration the formulation of a permanent policy concerning dual completions, which were permitted during the war as a means of conserving equipment. Commission engineers doubt that production by this method permits drainage of a sand as effectively as would result from a single completion. This is true especially of wells in the pumping stage. They are concerned also about the difficulty of preventing the connecting of one reservoir with another and the prevention of regulation enforcement where operators take both allowable from one sand.

☆ East Texas

Smackover Prospect Slated Northeast of Hawkins Field

Smackover lime prospect to be drilled northeast of Hawkins field; Anderson County wildcat has gas show in Travis Peak; second test in Mount Sylvan area nearing pay.

Wood County: Humble Oil & Refining Company's McKnight and Rosen 1, situated 660 feet out of the southwest corner of a 320-acre tract and the W. R. James Survey, A-335, is being started as a Smackover lime prospect, or 12,000 feet. It is ½ mile north of the northeast edge of the 8800-acre Hawkins field.

Amerada Petroleum Corporation's Brown 1, Winnsboro field, flowed 42 barrels of 46.3-gravity oil, with gas-oil ratio of 2250/1, for completion through ¼-inch choke from Gloyd perforations at 8260-85 feet. Application is pending to dual complete from the 7900-foot Bacon lime perforations, thus becoming the company's first dual completion in the state.

Anderson County: Humble's Freeman 1, Brushy Creek prospect, was drilling hard Travis Peak sandstone at 12,595 feet, and carrying heavier mud to control high-pressure gas show at the 12,560-foot level. This wildcat also had a similar high-pressure zone in the James lime at 10,545 feet, but both are comparatively thin.

Cherokee County: Hunt Oil Company's Andrews-Pure 1, 2 miles west by north of Jacksonville and a Travis Peak prospect, was drilling Basal Woodbine at 5065 feet, having showed salt water in this sand.

Smith County: Ed Pace and Gordon Maclean's Johnson 1, situated 5900 feet southeast of the Mount Sylvan field discovery, was drilling at 7070 feet, or within 300 feet of the projected Paluxy pay. This confirmation well varies from 17 to 35 feet low on markers below the Woodbine.

Indian Leases Sold

The Ashland Oil & Refining Company, Tulsa, paid the top price of $36.60 an acre for a 40-acre tract, at an oil and gas lease sale of the Five Civilized Tribes in Muskogee May 14. The land comprises acreage in NW SE 14-9n-5e, near the new East Seminole pool development in Seminole County. Of the 9935.5 acres offered at the sale in the office of A. M. Landman, superintendent, 5282.19 acres were sold for a total bonus of $52,258.48.

☆ East Texas Border

Marion County's Travis Peak Find May Test Deep Showings

Marion County discovery to be completed on pump, may test deeper showings; northwest outpost of Carthage wet gas field spudded in; Cass County and Shelby County wildcats drilling without shows.

Marion County: Magnolia Petroleum Company et al's Orr 1, Fowler Survey, 3½ miles southwest of Avinger, still swabbing 10 barrels of fluid daily, of which 97 percent is oil, from perforations at 7568-77 feet, was completing removal of drilling rig preparatory to moving in derrick for completion under pump. Operators are reported considering whether the new Travis Peak find should further explore the formation, where a gas-distillate showing was recorded at 9023-25 feet, as far as 9500 feet. Another possibility is to carry the test to the Smackover, which would rank as a full wildcat project. Total depth at present is 10,513 feet.

Panola County: Rogers Lacy's Holt 1, A. H. Williams Survey, 3 miles northeast of Beckville, was spudded. This well was staked as a new northwest outpost operation for the spreading Carthage wet gas field. Delta Drilling Company's Guill 3, B. Strickland Survey, 7 miles east of Carthage, will be drilled as a new Cotton Valley zone test, to go to 8500 feet.

Cass County: W. B. Hinton's Betts 1, Beard Survey, 4 miles southeast of Marietta, is drilling below 5560 feet. The wildcat logged a Woodbine section at 3748-78 feet, cuttings showing sand and sandy shale with dead oil stain; and topped the Paluxy by samples between 5060-70 feet. Paluxy was porous, without showings.

M. A. Freeman's Stephenson 1, Perry Survey, 2 miles northwest of Jefferson, has been testing from the Pettit, and has just come off completion try. It was good for 165 barrels daily on pump at 6495 feet.

Shelby County: Humble Oil & Refining Company's Pickering 2, Francois Survey, Huxley area, is drilling below 1800 feet. It is 5000 feet southwest of the discovery well, Humble's Pickering 1.

Rommel Addresses AIME

More than 80 engineers attended the May meeting of the Gulf Coast Section of the AIME on May 14 in Houston.

A. Ross Rommel, safety engineer for the Louisiana Division of Humble Oil & Refining Company, spoke on "Effective Technical Group Speaking."

☆ South Central Texas

Gas Discovery Southeast of Valley Wells Is Completed

Gas discovery southeast of Valley Wells completed; Fashing wildcat drills below surface pipe; large drilling program planned for Gas Ridge field.

Dimmitt County: Barnsdall Oil Company's Henrichson 1, gas discovery 2 miles southeast of Valley Wells, finally made a dry test after several attempts in the Wilcox showed salt water. Sands indicative of oil were logged at 3994-4034 feet and tests deeper in the well failen to make oil production. The well tested dry in perforations at 5168-77 feet after a similar test showed salt water through perforations at 5215½-21½ feet. Several tests in the sand at 5214-30 feet failed. Total depth is 5208 feet and 5½-inch casing is set on bottom.

Atascosa County: H. R. Smith and Skinner & Eddy Corporation are drilling in Hurt & Tartt 1, new wildcat 3 miles northwest of Fashing. The well was spudded and has set surface casing and is scheduled for 6500 feet to test the Wilcox. This new wildcat is in the James Wilkinson Survey 144, A-882, on a 160-acre lease, and is 6600 feet northeast of Gulf Oil Corporation's Hurtt & Tartt 1, dry hole at 6632 feet and approximately 8800 feet southeast of Gulf's Ada Tom 1, a 10,528-foot dry hole in the Edwards lime.

Bexar County: The Gas Ridge field is due for some extensive drilling in the coming months. H. A. Pagenkopf (L. V. Chenoweth and Glen Harroun), who have been attempting to develop deep production, are reportedly beginning a 100-well drilling campaign in the 475-foot shallow sands. A mass-production method has been worked out whereby Glen Harroun will drill each well with his large rig in about 1 day, set pipe and skid to the next location. A spudder will make the completion. It is likely that these operators will make another deep test to the Edwards lime zone. The Southwest Drilling Company has staked 9 additional tests in the area, in the southeast section of the company's Mathilda H. Covell et al 400-acre lease in the Lucas Munoz Survey 86.

☆ Southwest Texas

Starr Wildcat Has Small Oil, Gas Shows Before Abandonment

Non-commercial shows of oil and gas made in Starr County wildcat before abandonment; Calliham well tests gas; Sun drills ahead on second test in Webb County gas discovery area.

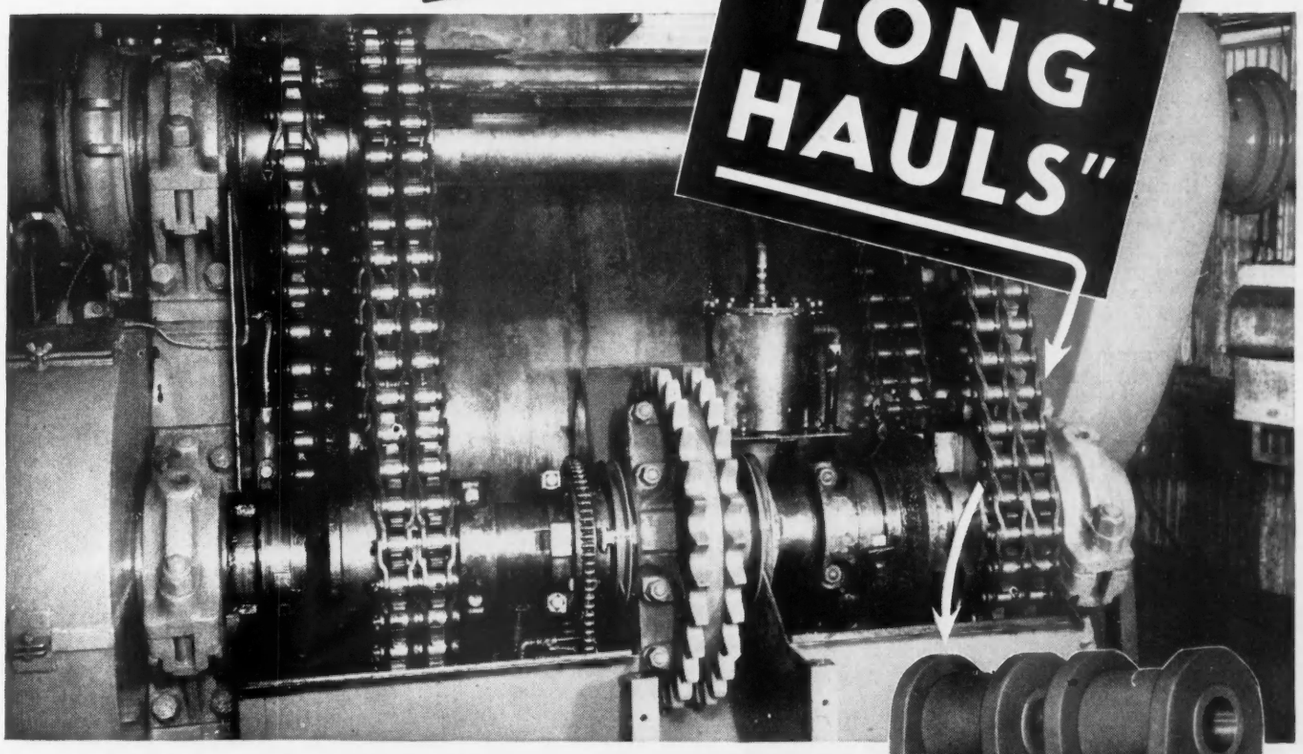
Starr County: George H. Echols' M. M. Garcia 1-A, wildcat 1½ miles northwest of the new Frio production, southwest of the Rincon field, tested a small amount of oil and gas at shallow depths before being abandoned. The shows were not considered sufficient for commercial production. The well was drilled to 3180 feet to the Frio, and set 5½-inch casing to about 2600 feet. Perforation depths were not given.

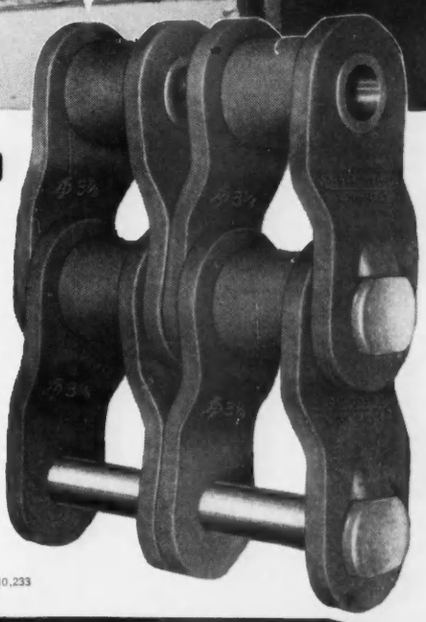
McMullen County: H. A. & M. B. Johnson's Paul Snoga 19, James Garner Survey, on the old H. Coquat-Stitz lease, and 200 feet north of the No. 8 well in the Calliham field, has tested gas from perforations at 1012-14 feet in the Pettus sands. Originally scheduled for 1150 feet, the well was drilled to 1018 feet, where 5½-inch casing was cemented.

Webb County: Blanco Oil Company & Al Buchanan's Marrs McLean 2, wildcat in the Edginton Subdivision, Albercas Grant, 660 feet southwest of the McLean 1 dry hole, received some oil shows on 2 drill-stem tests. On a test at 2257-58½ feet, 48 pounds working pressure were developed and 130 feet of oil emulsion (50 percent oil) and

10,000
12,000
15,000
18,000
20,000

SHORT PITCHED FOR THE "LONG HAULS"





10,233

LINK-BELT SS-3125 Hyper Rotary Chain

It won't make a lot of difference how deep they go with this drawworks. When it was modernized, the owner specified Link-Belt SS-3125 HYPER double. And that means he's safely set for any depth.

That's Link-Belt's well-known short pitch API rotary chain that's engineered and precision-built to give the strength, durability and safety factor necessary for today's extreme drilling depths. It's the Link-Belt Chain that has provided new economy and dependability on routine ten, twelve and thirteen thousand foot holes by withstanding with ease the abnormal conditions, high speeds and loads encountered.

That's why many operators have standardized on Link-Belt SS-3125 HYPER double for the "long hauls". It's ready now for your deep, dependable drilling. It's the result of 70 years of chain development and improvement.

LINK-BELT COMPANY
Indianapolis 6, Dallas 1, Houston 2, Los Angeles 33, Kansas City 6, Mo., New York 7, Toronto 8.
Distributors in all fields.

LINK-BELT CHAINS ... a Type for Every OIL INDUSTRY SERVICE

205 feet of salt water were recovered. Bottom-hole pressure was 130 pounds. A second drill-stem test at 2260-61½ feet recovered oil and salt water. Total depth last reported was 2261½ feet.

Sun Oil Company's Isaac Hirsch et al 1-A, 3650 feet northeast of the company's Hirsch 2 gas discovery well, 25½ miles northeast of Laredo and in the J. Poitevent Survey 247, was drilling at 2200 feet with nothing of significance encountered to that depth.

☆ Lower Texas Coast

Magnolia Completes Oiler on La Gloria Southeast Flank

Magnolia completes oiler on southeast flank of La Gloria; Sliva field extension finaled as gas producer; wildcat north of Magnolia field completed for 100 barrels daily; Tynan area wildcat abandoned after extensive tests.

Brooks County: Magnolia Petroleum Company's T. S. Proctor 1, northwest corner of Lot 5, Block 1, Falfurrias Farms & Garden Tract, has been completed as an oiler on the southeast flank of La Gloria field. The well is about 1150 feet east of Magnolia's Church of the Brethren Unit 1, discovery for the deep flank production about a mile southeast of field gas-condensate production. Production is from 40 perforations at 7195-7205 feet, where drill-stem tests flowed 28 barrels of pipe line oil in 4 hours on ⅛-inch choke. Working pressures went to 900 pounds, and gas-oil ratio was calculated at 520/1. Tubing has been run for the completion and operators are waiting on an official potential. Total depth is 7213 feet, where 7-inch casing has been cemented. This producing formation is considered to be the same formation from which the Canales-Tijerina and the Blucher fields produce.

Bee County: Bridwell Oil Company's J. W. Baird 1, which extended production a mile west of the company's Sliva 1, discovery well for the Sliva field, has been shut in awaiting official potential. On initial tests from perforations in the Vicksburg zone, topped at 4394 feet, the well flowed gas through a 5/32-inch choke with 1675 pounds pressure on tubing and 1625 pounds pressure on casing. The shutin pressure on both casing and tubing gauged 1800 pounds. Dry gas production was also tested in the Frio zone at 3436-44 feet, where 280 pounds working pressure was developed in 5 minutes. Total depth of the well is 4407 feet. The Sliva 1 produces from perforations in the Stillwell sand at 4377-88 feet, where production has steadied down to 10.35 barrels of 48.7-gravity oil, no water, on 7/64-inch choke. Gas-oil ratio was 8500/1 and tubing pressure was 825 pounds.

Jim Wells County: Ralph E. Fair's Reynolds & Richardson 1, discovery more than a mile north of the Magnolia City field and 6 miles southeast of Alice, has been completed for a potential of 100 barrels of pipe line oil daily through 5/32-inch choke from perforations in the 5400-foot Frio zone. On initial tests through perforations at 5403-14 feet, the well made some salt water, but this was squeezed off. Total depth is 5883 feet and 5½-inch casing is set to 5456 feet. Operator is now moving the rig to Wm. Filter 1, W. N. Staples Survey A-436, and 2350 feet northeast of the discovery.

San Patricio County: Southern Mineral Corporation's Katherine Clifton 2, wildcat near the Bee County line and 1 mile south of Tynan, and about 3 miles northeast of the Clifton 1 dry hole in the James B. Wilson Survey A-381, has been abandoned after extensive drill-stem tests on sands showing oil odor at 4623-29 feet. After drilling to 5305 feet, 5½-inch casing was set at 4674 feet and perforated at 4623-28 feet for the test. On a 3-hour drill-stem test, 4300 feet of salt water and 1 stand of mud were recovered. Only 2½ pounds of working pressure were developed.

Tulsa U. Gets Grant

The Research Corporation of New York City has given $3000 to the University of Tulsa for use by its petroleum sciences and engineering department for petroleum reservoir research and study on subterranean brines under pressure. The project will be directed by Dr. Franklin T. Gardner, professor of chemistry, and the student fellowship which is included in the grant will be given to Robert McCay, honor graduate of Tulsa University in 1944 and a Pacific war veteran.

☆ Upper Texas Coast

Waller County Wildcat Recovers Sands Showing Gas-Condensate

Gas-condensate reported in Waller County wildcat; 2 good gassers completed at Daboval; Humble finally abandons deep test at Raccoon Bend; Sugar Valley outpost tests gas and oil; South Nome wildcat makes salt water on tests; gas-condensate well completed to extend production at Red Fish Reef.

Waller County: Floyd L. Karsten's J. J. Menke 1, wildcat in the H. M. Coats Survey, Abstract 19, 2 miles south of Hempstead and about 5 miles north of Raccoon Bend field, has recovered sands showing condensate and gas in cores from 7410-40 feet. The last 10-foot section cored contained 2 feet of the condensate sands. According to reports, this show should be in the Wilcox formation. Operators plan to core ahead possibly 100 feet before continuing drilling operations. The test is scheduled for 9000 feet.

Wharton County: Floyd L. Karsten has completed 2 new gas-condensate producers in the Daboval field. The C. F. Daboval 1, John Bagnal Survey, Abstract 495, Block 72, was reported making an estimated 30 million cubic feet of gas per day on open flow from perforations at 6828-32 feet. Tubing pressure built up to 2450 pounds when tested on ⅛-inch choke. Same operator's Adrian Johnson 1, John Bagnal Survey, Abstract 499, Sect. 78, was completed for an open flow of 25 million cubic feet of gas daily from perforations at 6218-22 feet. When tested on ⅛-inch choke, the tubing pressure gauged 2500 pounds. Fluid tests have not been made on either of these wells.

Austin County: Humble Oil & Refining Company's Luther R. Sherrod 16-Y, deep test for the Raccoon Bend field, Wm. C. White Survey, Abstract 101, drilled to 11,447 feet into salt, set a 200-foot cement plug from 11,018-218 feet, and after 2 drill-stem tests higher up the hole, has been abandoned. A test at 8786-8801 feet recovered mud cut with oil and gas, and while drilling at 11,018 and 11,180 feet, the well kicked, causing the pipe to stick in both cases.

The Pure Oil Company's Willie Stepan 1, wildcat test in the Welcome area, 3½ miles southeast of the Brenham dome and in the Elizabeth M. Kuykendall Survey, Abstract 60, is drilling below 7260 feet. It is scheduled for a Wilcox test to 9000 feet.

Matagorda County: Skelly Oil Company's C. C. Talcott 1, east outpost test for the Sugar Valley field, 2000 feet northeast of the Cocke 1 and 2650 feet southeast of The Superior Oil Company-Blaffer's Thomasson 1, drilled to 8500 feet where it is being cored. A drill-stem test was conducted at 8061½-70½ feet, where the well flowed gas and a small amount of oil. Another drill-stem test made at 8492-96 feet flowed gas and oil with a slight show of salt water.

Jefferson County: Sun Oil Company's Texas Public Service Farms Company 1, wildcat test in the south Nome prospect, John W. Kirby Subery Survey, Abstract 586, and 1½ miles east of production in the Nome field, was waiting on cement to set after squeezing 40 perforations at 6365-75 feet where an unsuccessful drill-stem test was made. Recoveries from the test were 25 stands of mud and salt water, 25 stands of clear salt water, and 2 stands of mud. Total depth is 10,300 feet with 9⅝-inch pipe set at 8754 feet.

A. H. & C. L. Rowan's Beaumont Building & Loan Company 1, wildcat test on the north flank of the Amelia field in the C. Williams Survey, A-59, about 3 miles west of Beaumont, is continuing cutting and fishing operations on drill pipe that became stuck when the well kicked while drilling at 8725 feet. A log was run to 8200 feet with no indications, so drilling went ahead. A fault was crossed which is believed to be the source of trouble.

Galveston County: Humble Oil & Refining Company's Galveston Bay State A-35, in Sect. 225, has been completed as a gas-condensate producer to extend production of the Red Fish Reef field in Galveston Bay about a mile east. On an initial test, the well flowed 75.6 barrels of 51.4-gravity condensate and 1,446,000 cubic feet of gas daily through a ¼-inch choke from 63 perforations at 11,038-048 feet and at 11,066-067 feet. Tubing pressure gauged 3600 pounds during the test. Total depth of the well is 11,242 feet and 5½-inch casing is set on bottom. It is considered possible that this is to be a new sand for the field, inasmuch as the sand topped at 10,990 feet is about 75 feet lower than the deepest sand in the field.

☆ South Louisiana

Drilling Stepped Up in Mamou Field of Evangeline Parish

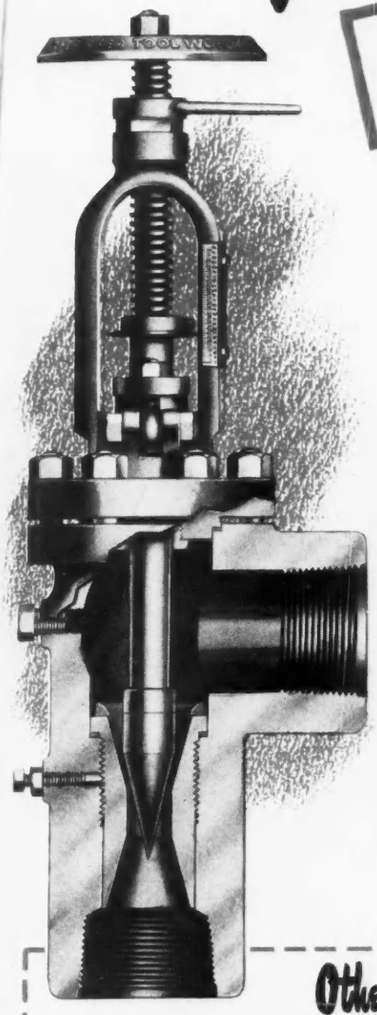
Drilling activity tripled at Mamou; deep sand discovery well at Egan shows salt water; Holmwood wildcat is under way; largest producer completed in Bon Air field; China area wildcat drills out cement plug; LaFitte deep pay gets second good producer.

Evangeline Parish: Considered the most important development of the year

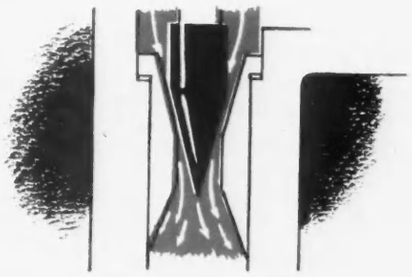
All adjustable Flow Beans alike?

NOT AT ALL!

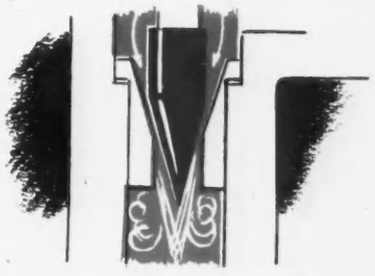
Look at the plus features you get in Shaffer Flow Beans!



ONE adjustable flow bean may look like another . . . but don't be fooled. The spot where the work is done is in the orifice . . . and here's where Shaffer—the organization that *pioneered* adjustable flow beans—has engineered extra performance and higher flow efficiency into Shaffer Adjustable Flow Beans. Notice how the orifice tapers at *both* the entrance and discharge sides. This important feature permits the fluid to flow through the orifice with less turbulence and emulsification. Here's why:



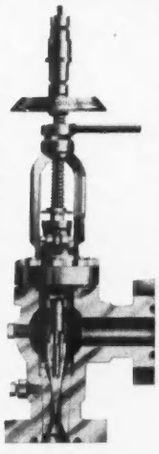
IN THE SHAFFER FLOW BEAN the fluid is guided into the orifice by the tapered inlet . . . then on the discharge side is guided out again by the tapered outlet. This controls the fluid flow, bringing it gradually to the full diameter of the discharge pipe, ***without the turbulence and emulsification caused by a straight orifice tube.***



IN ORDINARY FLOW BEANS the discharge side is a straight tube without the taper characteristics of Shaffer Flow Beans. Fluid emerging from this straight bore is not controlled as it flows into the discharge line. This uncontrolled flow causes eddy currents, increases flow turbulence, and tends to emulsify the fluid.

This Shaffer advantage is important. Less emulsification means less treating costs for separating water from the oil . . . and greater handling efficiency in your production and refining operations. And here's another advantage . . . the Shaffer Adjustable Flow Bean may be connected in the hook-up so that the flow is either toward or against the tip —an advantage that is not practical with the straight discharge type of orifice. This feature greatly facilitates hook-ups, and permits wider versatility in installing Shaffer Flow Beans than with conventional types.

Other Shaffer Features...

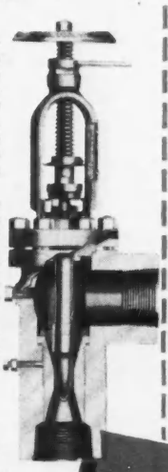


THERMO TIP

And here's a unique Shaffer development that is a big help in handling waxy fluids—or where rapid expansion of gas in the crude oil causes ice to form at the orifice. It's a tip which incorporates an electrically heated element that heats the fluid as it passes through the orifice, thus preventing ice from forming or wax from clogging the orifice and choking the fluid flow. The unit operates from any standard 110-volt circuit, and the tip in the 2" size is heated to about 850° F. under atmospheric conditions.
On larger sizes greater heat can be obtained if desired.

MICRO TIP

Often it is desired to secure an equal increase in opening area for each turn or fractional turn of the adjusting screw throughout the entire travel of the tip. You get this feature in the Shaffer Micro Tip with which any Shaffer Flow Bean can be furnished.
The advantage of this tip is that very small openings can be secured with great accuracy—and the increase or decrease in the size of the opening will be **absolutely uniform** throughout the entire travel of the adjusting screw. In addition, this tip provides a flow pattern that duplicates that of an almost perfect venturi tube.



Also where sand is a problem, special abrasion-resisting tips are available to minimize wear.

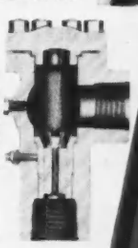
FLANGED OR THREADED CONNECTIONS... WIDE RANGE OF SIZES

There is a Shaffer Adjustable Flow Bean to fit every requirement . . . whether flanged or threaded connections . . . bolted or threaded yokes . . . and in sizes from 1" to 6" pipe. Pressure test ratings up to 10,000 lbs. per square inch. See your Shaffer representative for complete information on these Flow Beans . . . or write direct!

Send for complete Shaffer Catalog.

INTERCHANGEABLE POSITIVE CHOKE

Here's a way to cut hook-up costs. Use the Shaffer Adjustable Flow Bean to determine the proper size orifice for pro-ration purposes. With this determined, the yoke, stem and tip can then be replaced with an insert and fixed choke having the proper size hole. A blanking off cap is substituted for the yoke—and you have a positive fixed-diameter choke, while the yoke, stem and adjustable tip are salvageable for other applications.



For helpful information on Shaffer equipment, see Pages 2687 to 2730 of your Composite Catalog.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, Calif. • California Service Shops: Santa Fe Springs and Taft • HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 W. 2nd St. • OKLAHOMA CITY, OKLA., Acme Oil Tool Co. 1001 S. E. 29th St. • EXPORT SALES OFFICE: Shaffer Tool Works, 30 Rockefeller Plaza, New York, N. Y., U. S. A.

is Magnolia Petroleum Company's Mamou field discovery which was completed on the eve of 1946 to open up good production in the 11,500-foot horizon in the Wilcox formation. Average production is more than 200 barrels daily per well and Magnolia now has 6 active drilling rigs in the Mamou area with reports indicating the company will triple this number in the coming few months. The pay sand in the discovery well is 43 feet thick and the reservoir energy is substantial enough to produce a tubing pressure of 4200 pounds during the initial potential tests on 8/64-inch choke. Extent of the field has not been determined, but offsets to the discovery have been staked, bringing the total to 7 new wildcats in addition to those already under way.

Acadia Parish: Sun Oil Company & Sohio Petroleum Company's Elizabeth Regan 3, discovery well for a new deep sand in the Egan field, and located in 31-9s-1w, was showing 50 percent salt water while testing flow capacity of the well. During an 18-hour test, the well flowed 321 barrels of fluid, 50 percent salt water and 50 percent 43.7-gravity condensate, through 9/64-inch choke while showing 6500 pounds pressure on the tubing. The well had been drilled to 13,500 feet, with 5½-inch production pipe set to 11,986 feet and perforated with 96 shots at 11,874-906 feet for the original production test. Operators probably will rework this well in an effort to squeeze off the encroaching salt water zones from below.

The same companies' Regan Unit 1-B, Egan field, 31-9s-1w, is cleaning into pits after being perforated with 40 shots at 10,085-094 feet. Tubing pressure was gauged at 1700 pounds while the well flowed through a 9/64-inch choke. Total depth is 10,150 feet and 7-inch pipe is set on bottom.

Jefferson Davis Parish: Sohio's Claudius Fontenot et al 2-B, west offset test to No. 1-B well, and in 16-10s-6w, has been completed for the largest producer to date in the Bon Air field. On a 24-hour test, the well flowed an estimated 259 barrels of 38.4-gravity oil through ⅛-inch choke. Gas-oil ratio was calculated to be 634/1, and the tubing pressure gauged 1175 pounds. Pipe was perforated with 12 shots at 9701-03 feet in favorable sands picked up from 9688-9710 feet. Total depth is 9757 feet and 5½-inch casing is set to 9755 feet.

Sohio's W. L. Trimble 1, wildcat in the China field area, and in SW¼ NW¼ 2-8s-4w, was drilling below 9150 feet in shale after going below the 7-inch protection string set at 8170 feet. The well is scheduled to test the Vicksburg near 9750 feet.

Jefferson Parish: The Texas Company's George H. Kerner 4, in the southwest corner of 22-17s-24e, LaFitte field, was completed for the second well to produce from the deepest pay level in the area. The well made a potential of 204 barrels of oil daily through ⅛-inch choke from perforations at 10,260-280 feet. Gas-oil ratio was calculated to be 938/1 with tubing pressure during the flow at 1800 pounds. Total depth is 10,708 feet with 7-inch pipe cemented to 10,415 feet.

The Texas Company's Queen Bess Island (East Barataria) test, State Barataria Bay 2, on State Lease 356 in 20s-25e, has drilled to 12,012 feet and cemented 7⅝-inch protection string. Proposed depth is 14,000 feet.

☆ North Louisiana

Caddo Wildcat Prepares to Test; Five Failures Are Reported

Caddo wildcat preparing to test; deep wildcat in Bossier to be continued to Smackover; 5 failures reported, 4 in Richland Parish.

Caddo Parish: A Paul Gilbert's Thompson 1, prospective wildcat discovery, was preparing to test for production at 2955 feet.

Bossier Parish: Barnsdall Oil Company-Sohio Petroleum Company's deep wildcat, Carter-Burton 1, C NW NW 26-23n-13w, Plain Dealing area, was drilling in the basal Cotton Valley at 10,218 feet but had logged no shows of commercial value. Operators will continue to 12,000 feet, believed deep enough to test the Smackover.

Claiborne Parish: Union Producing Company's Meadows 1, 15-21-4w, Lisbon field, was shut in, waiting on pipe line connections, after a production test gauging 52 million cubic feet of gas daily from both upper and lower Alford.

Sabine Parish: Union Producing Company's wildcat Louisiana Long Leaf Lumber Company 1, 29-8-11w, in the Swolle area, is drilling below 9264 feet.

Richland Parish: Four failures were registered for the parish. American Liberty Oil Company's Mengel 15, 32-17-8e, in Big Creek field, was abandoned at 3050 feet. H. W. Todd Company's Chandler & Hill 1, wildcat in 13-16n-7e, was abandoned at 3534 feet. Cherry & Kidd Company's Archibald 1, wildcat in 29-16-7e, was abandoned at 3420 feet. Roy L. Fisher's Virginia Koerner 1, wildcat, 36-16-5e, was abandoned at 4502 feet. C. W. Sharop's Cochran & Franklin wildcat, 14-17-8e, is drilling below 4200 feet.

The West Delhi field may be extended a location southeast by R. F. Matson et al's Virgil Piercy 1, SE NE 36-17n-8e, which logged broken oil sand from 3338-60 feet. Hole is bottomed at 3361 feet. Crews are fishing for lost tool.

Tensas Parish: Chicago Mill & Lumber Company's Mutual A-2 is a new wildcat location in NEc 30-12-10e, 6 miles north of Holly Ridge production, and ¼ mile south of the operators' 8306-foot abandoned Mutual A-1.

Sohio's Biedenharn et al 1, 11-12n-12e, wildcat, is drilling below 9712 feet, near contract depth.

☆ Arkansas

Wildcat Between Gum Creek, Wesson Production Spudded

Wildcat between Wesson and Gum Creek production getting under way; 2 tests may extend Wesson production ¼ mile north and west; 3 wildcat failures scored.

Ouachita County: McAlester Fuel Oil Company spudded C. M. Wesson C-1, SW NE NW 24-15s-19w, and is drilling below 2000 feet; the company's C. M. Wesson D-1, NE SW NW 24-15s-19w, is below 3000 feet with plans to set production pipe shortly. The tests, if successful, will extend Wesson field ¼ mile north and ¼ mile west.

S. J. Felsenthal et al's H. H. Medlock

If we seem provoked . . .

In our 38 business years we have witnessed an insidious and malignant loss of personal freedom among workers. Legislation to restrict strikes is a sorry makeshift. We need legislation to guarantee men the right to work anywhere in America without reference to union affiliations. And we need for that assurance to have teeth so sharp that coercion and intimidation would be as certain of punishment as murder in England. No John L. Lewis could then enslave 400,000 free men, nor hold in the palm of one hairy hand the destiny of your business and ours.

WE'VE SUPPLIED OIL MEN IN OUR AREA FOR 38 YEARS

PELICAN WELL TOOL & SUPPLY CO.

SHREVEPORT LOUISIANA

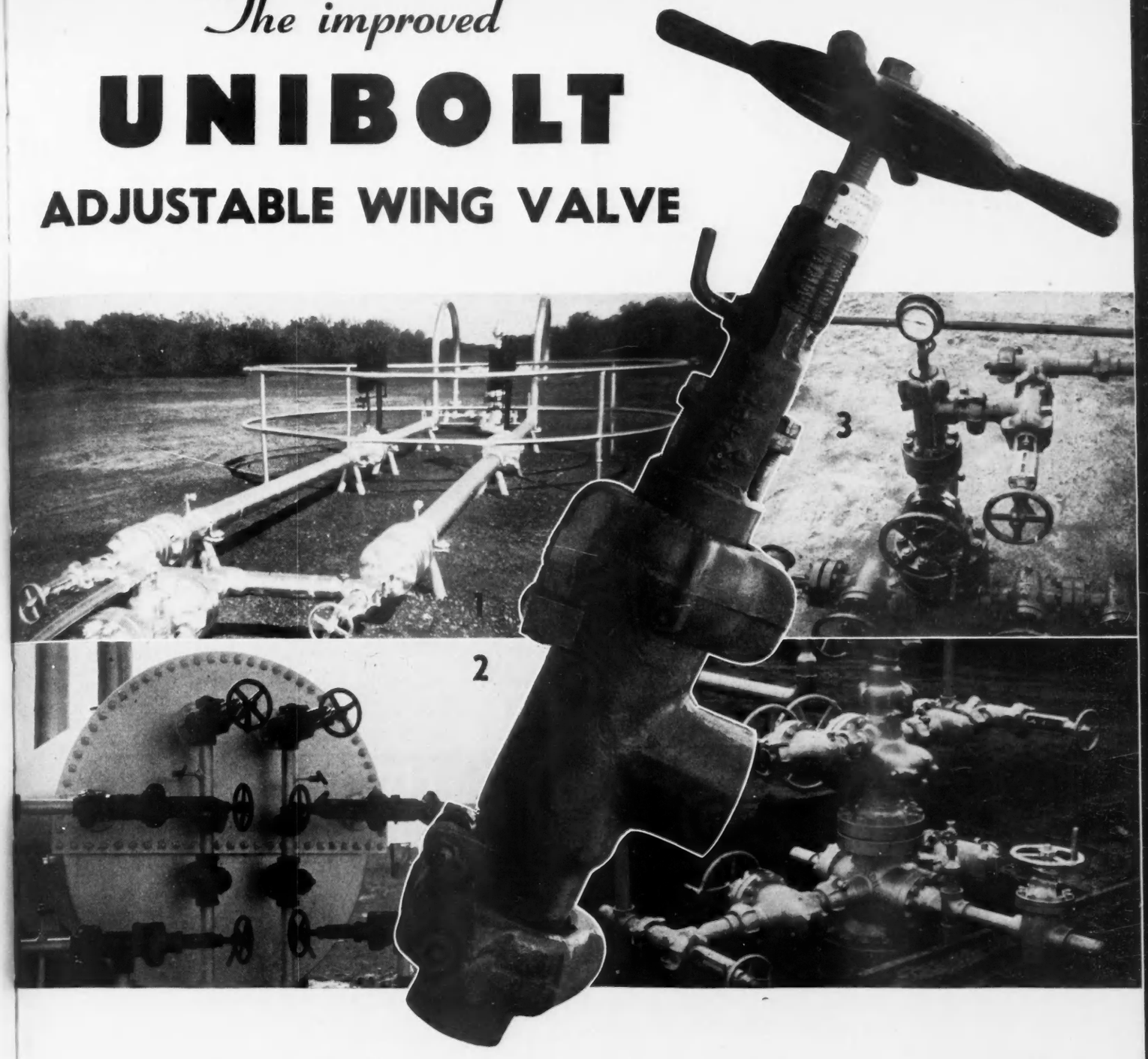
PELCO

Berwick
New Iberia
Lake Charles

The improved

UNIBOLT

ADJUSTABLE WING VALVE



. . . WITH MICROMETER ADJUSTMENT FOR PRECISE FLOW CONTROL

The UNIBOLT Adjustable Wing Valve, for years an outstanding production tool because of its long, trouble-free life and dependable performance, is now better than ever. Micrometer adjustment of the stem, assuring even more precise control of flow, has been added. Note, also, the sturdier tiller type handwheel and the more convenient stem locking arrangement.

Field proven features of the earlier model retained in the improved UNIBOLT Adjustable Wing Valve include: No threaded or flanged connections between component parts of the unit; easy conversion to positive type choke by substituting blanking plug for yoke assembly and replacing stem seat with positive bean; stems carburized for hardness and cadmium plated to resist corrosion; (hard chrome stems and seats also available) accurate centering of stem in orifice retards turbulence; a flow line coupling made integral with the body simplifies assembly in the manifold; special stem lubricant resists even light hydrocarbons and thus assures easy operation at all times; etc.

Write for a copy of the new UNIBOLT Catalog No. D-46 for complete mechanical details and field applications.

1 Two UNIBOLT Adjustable Wing Valves installed on a pulsation dampening manifold on a gas input well.

2 Six UNIBOLT Adjustable Wing Valves on a high pressure heater manifold.

3 UNIBOLT Adjustable Wing Valve assembled in a Christmas tree wing instead of conventional gate or plug valve.

4 Two UNIBOLT Adjustable Wing Valves on a high pressure Christmas tree manifold.

THORNHILL-CRAVER COMPANY

HOUSTON, TEXAS

UNIBOLT
THE ONE BOLT COUPLING

1, SE NE SW 29-15s-19w, 1½ miles southeast of Wesson production and 1 mile west of the Gum Creek field, has been spudded and is setting surface pipe.

Two wildcat failures were added to the state's score: Hunt Oil Company's J. H. Dawson 1, C NW NW 14-15s-18w, abandoned at 5780 feet; and J. L. Foster & Tom Green's Campbell 1, NE NE NW 10-15s-19w, abandoned at 4312 feet.

Columbia County: McAlester's E. A. Threadgill Estate Bpl, C NE SE 10-17s-19w, Village field, was finished as a dry gasser after several swabbing tests failed to produce fluid, and hole was deepened to 7426 feet.

Drew County: Derrick was erected for A. L. Cochran's J. A. Cooper 1, NW NE 7-11-4w, C. A. Kinnard's McCauley 1, another wildcat in NE SW 14-12-6w, is waiting on orders at 5057 feet.

Logan County: Arkansas-Oklahoma Gas Company's N. C. Biggs 1, NE NW 7-7-27, is drilling below 4372 feet, having sidetracked hole at 3250 feet.

Lonoke County: G. D. Howell's Geneva Barnwell 1, wildcat in 18-4-9, was abandoned after drilling to 1765 feet in sandy shale.

Controllers Elect

Three new members from the petroleum industry have been elected by the Controllers Institute of America. They are Ivan R. Cunningham, controller of the Creole Petroleum Corporation, New York City; George L. Duwe, controller of Cameron Iron Works, Inc., Houston; and Birnie V. Edridge, assistant secretary and assistant treasurer of the Bovaird & Seyfang Manufacturing Company, Bradford, Penn.

☆ Mississippi

Brookhaven Activity Quickened; Field Gets Best Producer

Activity in Brookhaven field increases; good shows indicated in second section of Wilcox zone for Baxterville field test.

Lincoln County: Roeser & Pendleton's School Land 1, NW NW 16-7n-7e, Brookhaven field, has been dually completed for the best producer in the field. Production is from the Marine Tuscaloosa at 10,316-343 and 10,391-413 feet with tests indicating the best potentialities from the lower sand. On initial production test the well flowed 519 barrels of 36-gravity oil per day through 17/64-inch tubing choke. Successful completion of the well confirms the southern section of the field as having far better prospects than the northern part where the sand pinches out and which has produced some dusters.

The California Company successfully completed Ras Smith 1, NEc 8-7n-7e, in Brookhaven, which flowed 336 barrels of 36-gravity oil from 168 perforations at 10,255-283 feet on initial test.

Sharkey County: J. H. Gwin's Rice 1, SW SW SW 14-11n-7w, Cary field, is drilling below 1612 feet in its drive for the 5000-foot zone. This is the first activity in this small field since last fall.

Lamar County: Gulf Refining Company's Virgil Davis 1, NEc SE 7-1n-16w, which indicated first possibilities of commercial production in the Wilcox horizon for the Baxterville field, has developed another potential producing zone in the same horizon. In a drill-stem test at 5239-58 feet, a small amount of gas-cut mud with shows of oil were recovered in addition to a fair flow of gas. Previous shows were recorded at 4844-4902 feet.

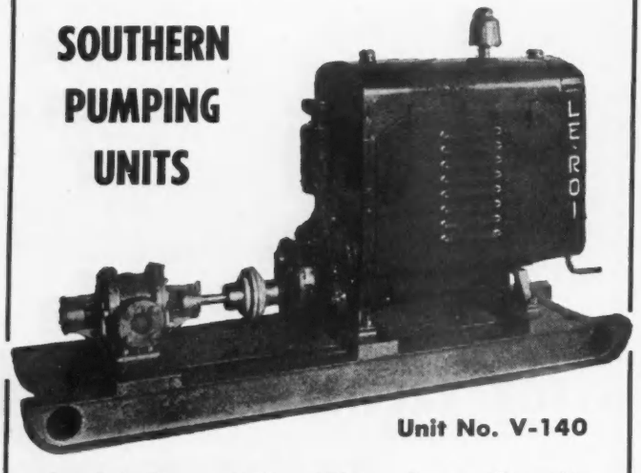
Clarke County: Sun Oil Company's Long Bell Petroleum Company 1, wildcat in NWc 7-2n-17e, is bottomed temporarily at 5354 feet for repairs on equipment. Cores have yielded no encouragement. Renewal of activity in the Langsdale field, which has seen no further development in recent months, is assured by Kirby Oil Company, which has asked permits for 5 tests.

Copiah County: Sun's Mrs. Lee Little 1, NWc 8-2n-4w, wildcat, is drilling below 2253 feet with no shows reported. Several sections of the hole from 1110 feet downward have been cored with no results.

Jasper County: Southern Oil Production Company's J. E. King 1, wildcat in SE SE 30-1n-12e, which has been shut down at 6692 feet after recovering no shows from any horizon, is contemplating additional exploration of deeper horizons. Well is presently bottomed below the Tuscaloosa. Gulf's Sallie E. Dantzler 5, NWc NE NW 3-10n-10w, East Heidelberg field, was preparing to install pump after successfully establishing production from the Eutaw at 4860-63 feet. Well was swabbed in at an estimated 60 barrels per day.

Madison County: Vaughey & Vaughey's Garrett Unit 1, SW SW NE 11-11n-3e, appears to have a producer in the old Pickens field and was preparing to install pump. A small section of saturated sand was encountered at 4860-63 feet, and driller bailed oil with no salt water present.

SOUTHERN PUMPING UNITS



Unit No. V-140

Le Roi Power Unit — Viking Pump. Capacity 140 barrels per hour.

Complete units and replacements in Houston and Kilgore stocks.

SOUTHERN

Southern Engine & Pump Company

HOUSTON DALLAS SAN ANTONIO KILGORE

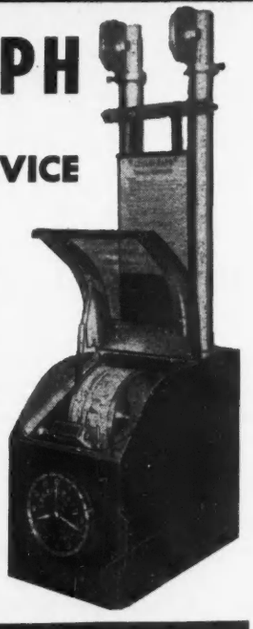
FOR ACCURATE DRILLING TIME DATA

GEOLOGRAPH

MECHANICAL

WELL LOGGING SERVICE

Hundreds of operators now depend on this mechanical recorder for a permanent record of drilling time and coring time in minutes per foot. Foot by foot, the rate of drilling is measured by the Geolograph, and graphically recorded along with such drilling operations as round trips, connections, and shut-down time.



Reasonable rental rates for Geolograph Service make it available to all operators. Write for further details and availabilities.

GEOLOGRAPH TIME WILL TELL

"TIME WILL TELL"

THE GEOLOGRAPH CO.

25 North Western Oklahoma City 4, Oklahoma

☆ Florida

Attempts to Develop Oil Shows Are Made by Monroe Wildcat

Monroe County wildcat attempting to develop oil shows; Humble's Collier County strike to make good producer.

Monroe County: O. D. Robinson's State Well 1, NEc NW 29-59s-40e, deep wildcat, is running casing in attempt to develop oil shows which were previously encountered in a lime section between 10,175-262 feet. Well has bottomed at a total depth of 12,051 feet and cores taken a few feet above that point have recovered slight shows, but nothing to indicate commercial possibilities.

Gulf Refining Company's State 1, SWc 2-67s-29e, wildcat, is running core tests at 7203 feet with no shows.

Hillsborough County: Humble Oil & Refining Company's wildcat, T. S. Jameson 1, NE NE 7-31s-22e, is drilling below 9128 feet with no shows.

Hernando County: The Ohio Oil Company's Hernasco Corporation 1, NWc 19-23s-18e, wildcat, is coring at 7426 feet. No shows have been indicated.

Dixie County: Stanolind Oil & Gas Company and Sun Oil Company's Perpetual Forest 1, NW NW 5-11s-11e, wildcat, is working below 1710 feet.

Collier County: Humble's Gulf Coast Realty 6, SW NE 19-48s-30e, Sunniland field, has given evidence from production tests that it will make a good producer. In initial test the well flowed 225 barrels of 25.6-gravity oil per day through 5/32-inch choke with gas-oil ratio of 67/1. Production is from open hole at 11,558-578 feet. Humble is readying for another test with Gulf Coast Realty Company 8, which will be about ½ mile south of the new producer.

Dade County: Another wildcat was getting under way, as Gulf Refining Company started building derricks at State of Florida 1-C (Model Land Company) T-60s-35e, 80 miles southeast of the Sunniland field in an area that has never been surveyed.

Osceola County: Humble's wildcat Carroll 1, C SE SE 10-27s-34e, which is seeking deep production horizons, plugged back from 3407 feet to 1947 feet to straighten crooked hole and is now drilling below 3853 feet in broken lime.

Levy County: Sun's J. P. Goethe 1, C NW SW 31-14s-17e, is also waiting on cement at 2662 feet after cementing 7⅝-inch casing.

Alabama

Glen D. Rose's First National Bank of Birmingham 2, NW SE 30-12s-7w, Walker County wildcat, has resumed operations and is drilling below 1803 feet. No shows have been reported.

Winston County: Glen D. Rose Oil & Gas Company's First National Bank of Birmingham 3, SWc SE 7-12s-8w, wildcat, is drilling below 1131 feet with no shows.

Georgia

James E. Weatherford's wildcat H. Wilkes 1, ½ mile west of Higgston, Montgomery County, in Military District 1567, is waiting on orders at total depth of 3434 feet. Electrical survey logged no showings of oil or gas.

This name on a reel — means

TOUGH WIRE ROPE

For rugged, long-lasting wire rope be sure it bears the name Wickwire Spencer. Every step in the making of Wickwire Rope is under constant, careful control, from the special formulae used in making the steel, through processing of the wire until it is exact within a fraction of a thousandth of an inch, through laying of the strands and final closing.

Order Wickwire Spencer Wire Rope and be assured of the utmost in performance, safety and long rope life. It is available in all sizes and constructions—both regular lay and WISSCOLAY *Pre*formed.

HOW TO PROLONG ROPE LIFE AND LESSEN ROPE COSTS . . .

Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 41 wire rope life savers, 20 diagrams, tables, graphs and charts.

SEND FOR YOUR FREE COPY

Send your wire rope questions to

WICKWIRE SPENCER STEEL

A DIVISION OF THE COLORADO FUEL AND IRON CORPORATION
EXECUTIVE OFFICES—500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit
Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

☆ California

Producer Near Completion In East Los Angeles Field

Third producer in East Los Angeles field near completion; many wells being deepened to "237" zone at Wilmington; test for Schist production in Torrance field abandoned; similar test in Tulare County also fails; Standard completes Kirby Hills gas well.

Los Angeles County: Richfield Oil Corporation's Keller 1, East Los Angeles field, has cored oil sand with first showings at 7200 feet. Casing will be set at 7575 feet. Location is in 9-2s-12w, about ½ mile north of Richfield's discovery well. On completion this will be the third producer in the field, others being the discovery well, Union Pacific Unit 1, and Richfield's Vail 1 in Sect. 16.

There are 4 other drilling wells in the field. Richfield has Vail 2 in Sect. 16 below 6450 feet and Edison 1, also in Sect. 16, below 5080 feet. Shell Oil Company's Pansini 1 in Sect. 23 is coring below 9010 feet and C. G. Willis' Simons 1 in Sect. 15 is drilling below 3790 feet.

In the Wilmington field, The Superior Oil Company has completed Community 1 in the "237" zone flowing 1600 barrels of 29.2-gravity oil through 37/64-inch choke. There are now 22 projects drilling or preparing to drill to the "237" zone, which is below the Ford zone and above the Conglomerate-Schist. Eight wells have been completed in the "237."

Jergins Oil Company's test for Schist production in the west end of the Torrance field is being abandoned at 4835 feet in Schist.

Standard Oil Company of California has abandoned 1 of the 3 wildcats it is drilling in the Leffingwell-La Habra area. Gerrard Community 1 in 11-3s-11w, quit at 7043 feet. Standard's deepest test in the area is Stern-Community 2-1 in 7-3-10, which is drilling below 9700 feet.

Tehama County: Northern Oil & Gas Company is preparing to abandon Tiger 1 in the Paskenta area, 1-23n-7w, after running electric log. Total depth is 2569 feet in hard black shale, probably Franciscan.

Merced County: In the Patterson area, Don Pedro Oil Company is preparing to deepen its No. 1 well in 9-6s-9e. Drilled originally to 4077 feet, operations were suspended in July, 1942.

Solano County: Standard has completed a gas well, Kirby Community 1 in 24-4n-1w, Kirby Hills area, flowing 4,100,000 cubic feet through ½-inch choke. Total depth is 2350 feet, plugged to 2110 feet. Location has been staked for Kirby Community 3, about 200 feet southwest of No. 1.

Tulare County: Gene Reid Drilling Company's wildcat, Wing 1, near Ducor in 22-23s-27e, which was endeavoring to develop production in the Schist at this location, has been abandoned at 2320 feet. Top of the Schist was placed at 1663 feet.

Kern County: The Temblor area continues to attract wildcatters, with Beverly Trading and Exploration Company spudding Anderson 1 in 31-29s-21e and W.P. 1 in 30-29s-21e.

At the extreme south edge of the Kern River field P. H. Frank and Elmer C. von Glahn are moving in equipment for Kern 1 in 8-29s-28e. In the Kern Bluff area, Tide Water Associated Oil Company has abandoned M. & T. Inc. 27-31 in 31-28s-29e with the Vedder gray. Total depth is 2967 feet.

Ventura County: Continental Oil Company has completed a good producer in the San Miguelito field. Grubb 44-2 in 24-3n-24w is flowing 1190 barrels of 31.2-gravity oil through 30/64-inch choke, with 580 pounds pressure on the tubing and 1350 pounds on the casing. Depth is 7885 feet with shut off at 6958 feet.

Oregon

The Texas Company has abandoned Cooper Mountain 1, wildcat 15 miles west of Portland. Total depth is 9263 feet, the deepest oil test in Oregon history. A company spokesman said all likely zones encountered were tested without obtaining anything but salt water.

Within ½ mile of the Portland city limits, Richfield Oil Corporation is drilling Barber 1. Crew is currently fishing for drill pipe. Total depth is 6522 feet.

Washington

Standard Oil Company of California's Whatcom County wildcat, Ferndale Community 11-61-5, was abandoned at 6230 feet without showings.

Louisiana Leases

Eight tracts of state land, totaling about 25,000 acres, were leased last week by the Louisiana State Mineral Board on bids amounting to $100,255 in cash bonuses, plus half that amount in annual rentals, plus royalties.

No bids were received on seven other tracts, and bids on another tract were rejected as too low.

THE UNIVERSITY OF TEXAS

19th Public Auction Sale of Oil and Gas Leases

Tracts located in Andrews, Crane, Crockett, Ector, and Upton counties; date of sale, June 7, 1946; to be held at the Stephen F. Austin Hotel, Austin, Texas, to begin at ten o'clock A.M.

For additional information write to the Secretary, Board for Lease of University Lands, University Station Box 2125, Austin 12, Texas.

☆ Michigan

Mecosta County Semi-Wildcat Is Producer from Dundee

Mecosta County semi-wildcat is producer from Dundee; Shell has oil show in Bay County wildcat.

Mecosta County: Rex Oil & Gas Company's Skalitzky 1, NW NW SE 8-14n-7w, Wheatland Township, semi-wildcat a mile east of the abandoned Wheatland pool discovery, flowed up to 65 barrels oil per hour from Dundee dolomite at 3701-02 feet. After tubing it averaged 10 barrels per hour pinched against 250 pounds tubing pressure. Rex, The Carter Oil Company and Sohio Petroleum Company control the bulk of lease acreage with several independents holding scattered leases. The outpost now appears as top development for state this year.

The play originally started in early 1945 when Smith Petroleum Company drilled Ortwein 1, which produced up to 70 barrels per day from Dundee dolomite at start. It quickly faded and was abandoned 3 months later. Three offsets were drilled to the same zone dry.

Ashby Drilling Company's Battle 1, NE SW SE 18-16n-10w, Green Township, completed for Michigan Stray sand gas discovery at 1245 feet, gauging 1,600,000 feet per day. The well is 5 miles northwest of the Big Rapids shallow gas pool.

Montcalm County: McClure Drilling Company's Wicks 1, SW NE NW 36-11n-6w, wildcat 4 miles west of the old Crystal field, showed 300 feet water and 2700 feet oil on bailer tests after standing 10 days. However, placed on the pump and cleaned out, the well pumped 91 barrels of oil with only a trace of water in 70 hours. Operator plans to deepen. Pay was logged in Dundee, topped at 3321 feet, and bottomed to test at 3338 feet, with 400 feet of fluid in 6 hours.

Bay County: Shell Oil Company shut down for orders at 3310 feet on the Boeing 1, NE NE NW 26-18n-3e, closely watched wildcat, with a slight oil show reported at 2967-75 feet. Dundee top was checked at 2859 feet.

C. W. Collin will acidize Baublitz 1, SW NW SW 35-17n-4e, ½ mile northwest of Shell's Pinconning discovery (1944) after logging half a bailer oil at 2926 feet, 102 feet in the Dundee. Gordon Oil Company's Augustyniak 1, NW SE NW 2-16n-4e, 660 feet south of the discovery, was dry in the Dundee at 2955 feet and Ervin Major's Koth 1, SW SW NE 2-16n-4e, ¼ mile south of the discovery, was dry at 2990 feet. It raised the dry hole total for the play to 8 since Shell completed the discovery, still producing 100 barrels daily flowing, pinched. No other wells have produced.

Coast API Meets

The Los Angeles Basin Chapter of the American Petroleum Institute held its regular meeting in the Shell Recreation Hall at Signal Hill, Calif., May 7. The program included a discussion by A. L. Hunter and W. E. Dunlap on "The Geology and Development of the West Newport Field," and a talk by R. L. Minckler, vice president of the General Petroleum Corporation, on "The Outlook For California Oil."

Storms Pool of White County, Illinois, Given New Pay Zone

Storms pool, White County, Ill., gets new pay zone; Pure extends Brownsville pool; Clinton County discovery completed; Pike County, Ind., test shows for discovery.

Sinclair Prairie Oil Company and The Ohio Oil Company's Riecken 2, NW NW SE 1-6s-9e, has given the Storms pool, White County, a new pay zone. The well swabbed 95 barrels of oil in 16 hours from Aux Vases sand at 3015-30 feet. Original production was in Waltersburg sand.

The Pure Oil Company's Owings 1, SWc 1-6s-8e, is extending the Brownsville pool in Hardinsburg sand at 2660-75 feet. On a 1-hour drill stem test, the well showed 330 feet of oil and some oil-cut mud.

Clinton County: Paul Doran's Thomas 1, NW NE NE 13-3n-1w, 3 miles north of Centralia pool production and the first discovery for the county in more than a year, was completed for 18 barrels of oil in 24 hours from Cypress sand at 1415-25 feet. Prior to a 5-quart shot, the well showed for better oil production.

Clay County: N. V. Duncan's Gibson 1, NW NW SE 2-4n-7e, 6½ miles northeast of Louisville, has set casing for production test of O'Hara lime at 2892-2902 feet. The well yielded 2100 feet of clean oil during a 1-hour drill-stem test for the first commercial-appearing production in the O'Hara in the area.

Indiana

Lichlyter's Conley 1, C E½ SW NW 3-1s-9w, Pike County, a mile west of the old Union-Bowman pool, is showing for a discovery in Waltersburg sand. During tests of pay at 1055-60 feet, the well swabbed 165 barrels of oil in 24 hours.

Natural Rubber Supply to Exceed Demand for 10 Years

Long-term world demand for natural rubber will be governed largely by its price in relation to synthetic rubber and by the rate of synthetic production maintained by the larger consuming nations for security reasons, but the demand for the natural product will probably be less than production capacity for the next ten years, Everett G. Holt, rubber advisor to the department of Commerce, has reported.

For a few years, however, demand for natural rubber will exceed supply because resumption of full production promises to be very gradual; thereafter, supply is expected to be limited by demand rather than by capacity to produce.

Holt based his forecast on the fact that Europe and Japan will consume less rubber for many years and the development of synthetic industries in the United States, Canada and Russia.

"In an attempt to become more self-sufficient in rubber, the Soviet Union has done considerable experimentation with kok-sagyz, guayule and other rubber-bearing plants, but the amount of natural rubber produced there is probably not large," he said. Imports of natural rubber have been running about 24,000 tons a year.

"Official statistics are not available for synthetic rubber production in Russia, but supposedly the annual output is about 100,000 tons. It is anticipated that the prewar policy of using maximum amounts of Russian-produced synthetics, and importing only necessary amounts of natural rubber, will continue."

Synthetic rubber requirements during the fiscal year beginning July 1 were estimated by President Truman at 732,000 tons, costing approximately $320,269,000 and requiring the operation of 37 plants, with six others to be maintained in stand-by condition and eight to be disposed of as surplus.

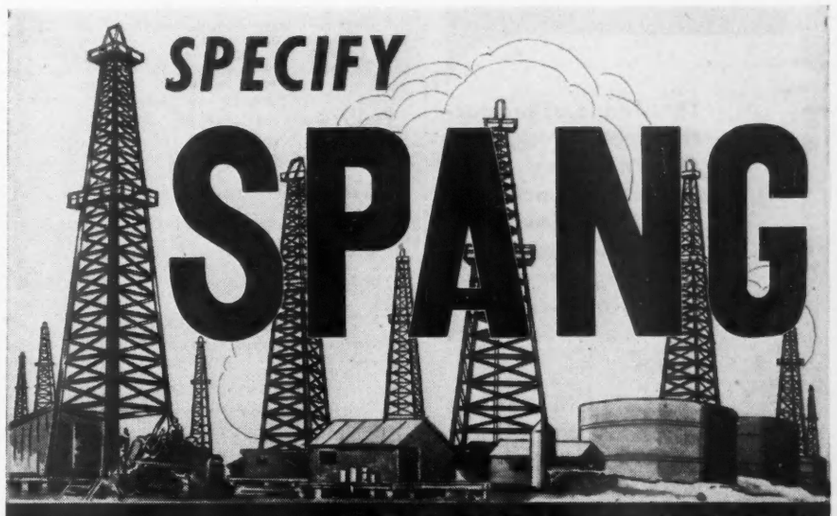
Synthetic rubber production for the current year is estimated at 714,000 tons, to cost $381,968,000.

Pearsall Field Deal

Highland Oil Company of Houston has purchased The Atlantic Refining Company's one-quarter working interest in the Pearsall field of Frio County. Approximately 3000 acres are involved. George and Herman Brown of Houston, owners of Highland Oil Company, now own three-fourths of the Pearsall field which consists of 22 producing wells on four leases.

Texas Offers Leases

The University Board for lease of State lands will hold an auction on West Texas leases in Austin about June 7. It will offer 20,000 acres of leases located in Andrews, Crane, Crockett, Ector, Upton and Reagan counties.



FOR THE BEST IN CABLE TOOLS

Fig. F533 Fig. F538

SPANG TUBING SPEAR
(Fig. F533)
SPANG TRAP SOCKET
(Fig. F538)

FOR FISHING TUBING Spang offers a variety of tools, including Combination-Type Tubing Socket, Slip-Type Tubing Socket with mandrel, Cherry Picker, Spang Alligator-Style Grab, Tubing Spears in a variety of types, and the Spang Trap Slip Socket (Ill.) which has a unique slip arrangement enabling it to catch tubing or slivers in almost any condition.

For the best in Cable Tools,
SPECIFY SPANG

THE HIGHER STANDARD

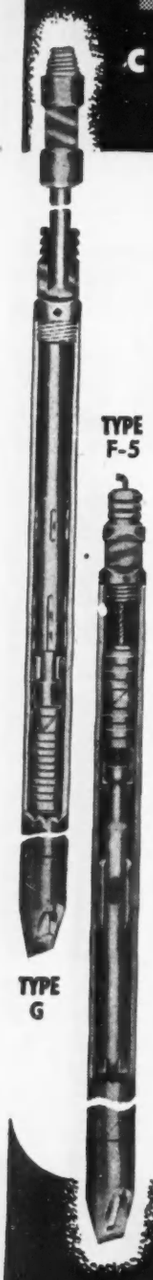
SPANG & CO.
BUTLER, PA.

YOUR DEALER SELLS SPANG TOOLS

USE A FASTER TROUBLE FREE WELL CONDITIONER

MID-CO

CLEAN-OUT BAILER



Thousands of production men through the Oil Industry have found "A Sure Fire Method" of avoiding decreased production by: Keeping wells in condition with the Mid-co Clean-out Bailer.

A trial will prove to you why the Mid-co Clean-out Bailer has won acclaim the World Over as the Outstanding Clean-out tool.

★ ★

G-type is recommended when cleaning out or drilling by anything in hole such as tubing, tools, etc.

F-5 is a "line travel" type Bailer whose patented plunger assembly insures highest possible efficiency.

FOR ADDITIONAL INFORMATION SEE COMPOSITE CATALOG PAGE 1903

Call, wire or write

MID-CO TOOL and SUPPLY CO.

SUBSIDIARY OF AIREON MANUFACTURING CORPORATION

1006 - 1012 S. E. 29th STREET
TELEPHONE 7-8586 BOX 1542
OKLAHOMA CITY · OKLAHOMA

EXPLORATORY COMPLETIONS

ARKANSAS WILDCATS

Ouachita County—Failures: Hunt Oil Co.'s J. H. Dawson 1, c nw nw 14-15s-18w, Massive anhy 3580, abnd 5780.

J. L. Foster-Tom Green's Campbell 1, ne ne nw 10-15s-19w, Nacatoch 1828, Tokio 2200, Travis Peak 2757, Cotton Valley 3900, abnd 4312.

CALIFORNIA WILDCATS

Kern County—Failures: Miller and York's Anderson 1, 20-29s-21e, Sheep Springs area, abnd 3343 ft.

Tide Water's M. & T. Inc. 27-31, 31-28s-29e, Kern Bluff area, Vedder 2701 ft, Vedder 2955 ft, abnd 2967 ft.

Tulare County—Failure: Gene Reid Dg. Co.'s Wing 1, 22-23s-27e, Ducor area, abnd 2321 ft.

Los Angeles County—Failure: Standard's Gerrard Community 1, 11-3s-11w, La Habra area, abnd 7043 ft.

FLORIDA OUTPOST

Collier County—Sunniland Extension: Humble's Gulf Coast Realty Co. 6, sw ne 19-48s-30e, 1 mi w of prod, flow 225 bbls 25.6-gr oil fr 11,558-578, lime pay, 5/32-in, gor 67/1, td 11,578.

ILLINOIS WILDCATS

Clay County—Discovery: K&B Drlg. Co.'s Hastings 1-A, sw se sw 12-4n-7e, pump 26 bbls, Cyp 2603-18 ft, td 2638.

Clay County—Failure: K&B Drlg. Co.'s Traub 1, se ne ne 13-5n-6e, abnd 2963.

Clinton County—Failure: J. L. Garard's Laux 1, se nw ne 7-3n-2w, abnd 1253.

Effingham County—Failure: J. A. Burhans et al's Flinn 1, se ne nw 25-6n-7e, abnd 3067.

Marion County—Failure: Nat'l Consumers Oil Co.'s Pickett 1, se ne sw 16-2n-4e, abnd 2853.

Shelby County—Failure: M. H. Richardson's Doll 1, sw ne nw 4-10n-6e, abnd 2153.

INDIANA WILDCAT

Spencer County—Failure: Indiana Farm Bureau Oil's Frank 1, nw sw sw 10-6s-6w, abnd 1475.

KANSAS WILDCATS

Sedgwick County—Discovery: Beech Aircraft Corp.'s Hinkle 2, se ne ne 1-27s-1e, pump 828 bbls, Burgess sand 2992-95 ft, td 2995.

Stafford County—Discovery: Alkay Oil Co.'s Gray 1, sw ne ne 11-24s-13w, flow 480 bbls, Lansing 3743-62 ft, td 3882.

WESTERN KENTUCKY WILDCATS

Butler County — Failure: Olstrum et al's Gardner 1, 22-I-32, abnd 1200.

Crittenden County—Failure: Reed & Pfunder's Dean 1, 20-K-19, abnd 1305.

Daviess County — Discovery: Watkins Drlg. Co.'s Massey 1, 5,259,000 gas, Walts 1158-67, td 1167.

Logan County—Failure: Cuiston & Cable's Hadden 1, 22-E-29, abnd 1603.

NORTH LOUISIANA WILDCATS

Bossier Parish — Failure: Barnsdall - Sohio-Continental's Crystal Ref. Co. 1, 28-21n-11w, Pettit porosity 6131-52, Cotton Valley 8205, abnd 9074.

Grant Parish—Failures: Lawrence - Manning Jacobs' L. C. Swope Est. 1, 18-9n-1e, abnd 4223.

D. H. Williams' H. A. Strong 2, c se se 28-9n-1e, abnd 820.

LaSalle Parish—Failure: Joe F. Belt Co.'s Urania Lbr. Co. 1, c nw ne 3-6n-2e, abnd 4524.

Natchitoches Parish — Failure: Magnolia's Union Saw Mill 1, c nw se 7-6n-6w, Midway 5800, L. Cret. 8770, Paluxy 8810, abnd 9542.

Richland Parish — Failure: H. W. Todd's Chandler & Hill 1, 13-16n-7e, Chalk 2851, abnd 3534.

NORTH LOUISIANA NEW PAY TEST

Tensas Parish—Lake St. John Deep Gas Discovery: Calif. Co.'s J. W. Brown 3, sw 46-9n-10e, Wilcox 3410, Tuscaloosa 8310, Massive sd 9107, perf Brown new pay 10,222-50, flow 4,500,000 gas, ¼-in, td 10,287.

SOUTH LOUISIANA WILDCAT

St. James Parish—Failure: T. G. Markley's Cyrial Bourgeois 1, 6-12s-5e, abnd 7389.

MICHIGAN WILDCATS

Allegan County—Failure: J. F. Reed's Jones 1, nw nw nw 4-3n-13w, abnd 1810.

Barry County — Failure: Louis Zellman's Briggs 1, sw sw sw 8-3n-10w, abnd 1952.

Kalamazoo County—Failure: W. D. Gannett's Sills 1, ne ne se 30-1s-12w, abnd 1390.

Mecosta County—Green Gas Discovery: Ashby Drlg. Co.'s Battle 1, ne sw se 18-16n-10w, Stray 1239 ft, flow 1,600,000 gas, td 1245.

Missaukee County—Failure: Pure's Bunnings 1, s½ se ne 30-22n-6w, abnd 1457.

Van Buren County — Failure: Circle Drlg. Co.'s Geiger 1, nw nw nw 13-1s-13w, abnd 1326.

MICHIGAN OUTPOST

Mecosta County—Wheatland Oil Extension: Rex O&G Co.'s Skalitzky 1, nw nw se 8-14n-7w, Dundee 3700 ft, flow 240 bbls, on choke, 250 lbs tp, td 3702.

NEW MEXICO WILDCAT

San Miguel County—Failure: Florence Drlg. Co.'s Thompson 1, c se nw 14-12n-22e, granite wash 4545, abnd in granite 4590.

OKLAHOMA WILDCATS

Hughes County—Failure: Sherrof & Apperson's Barnard 1, ne sw sw 24-8n-8e, abnd 3383.

Logan County — Failure: Frank Russell's Griffin 1, se se nw 33-15n-1w, abnd 5700.

Osage County — Failure: A. G. Oliphant's Osage 1, sw sw sw 31-26n-5e, abnd 3640.

WEST TEXAS WILDCATS

Andrews County—Failure: Stanolind's University 1-HH, c se se sect 12, blk 8, elev 3015 ft, anhy 2110, Yates 3120, Grayburg 4530, San Andres 4810, abnd 5600.

Crockett County—Failure: T. W. & J. M. Loffland, Jr. et al's Cox 2-a, 2298 ewl, 330 nsl I&GN Ry. 27, blk 2, elev 2181 ft, abnd 1067.

WEST TEXAS OUTPOSTS

Hale County—Anton Extension: Stanolind's Irish 1, c ne ne HE&WT Ry. 18, blk DT, 3¾ mi e prod, elev 3428, anhy 1475, San Andres 3185, Glorietta-Holt 4135, Clear Fork 4620, pump 354 bbls 30.6-gr oil, 12,000 gals acid Basal Clear Fork open hole 5515-5881.

Mitchell County — Westbrook Extension: Hickok & Reynolds' Floyd A. Langley 1, nw nw se T&P Ry. 25, blk 29, T-1-N, 2 mi w of prod, elev 2154 ft, brown li 1246 ft, San Andres 1596 ft, pump 56 bbls 27.5-gr oil, 8 bbls wtr, 10,000 gals acid broken Clear Fork 2259-3151 ft, td.

WEST CENTRAL TEXAS WILDCATS

Mills County—Failure: M. M. Miller et al's Savoy 1, 3493 snl, 4854 wel E. M. Pease sur 94, Marble Falls 2350, Barnett 2485, Ellenburger 2528-4217 ft, Hickory (Cambrian) 4217, abnd in red sand 4230.

Parker County—Failure: Bradley Kimbrough et al's Gilbert 1, 750 fr m/s/n 150 fr M/w/wl of GWT&P Ry. sur, A-1958, abnd 1552.

NORTH TEXAS WILDCATS

Archer County—Oil Discovery: Smiley-Norwood Drlg. Co.'s A. L. Harris 1, 1050 nsl 150 ewl blk 71, J. W. Harris sbdn, pump 45 bbls, sand 1122-26, td 1135.

Archer County Failures: W. T. Hutcheson et al's Harris 2, 150 wel 1400 nsl blk 60, J. W. Harris sbdn, abnd 1430.

Fain-McGaha et al's Huff 1, 1650 nsl 330 ewl of 369 of 738-ac tr, M. Fanning sur A-128, elev 1010, abnd 4397.

Childress County—Failure: John A. Murphy Jr. et al's Clark 1-A, (OWDD) 1980 snl 2080 ewl H&GN Ry. 6, blk 9, otd 6505, elev 1709, Clear Fork-Wichita Albany contact 1870, big lime 2470, dolomite 2660, Chase 2795, Cisco 3090, Canyon 4120, Strawn 5140, Mississippi 6205, Ellenburger 6732 abnd 7079.

Clay County—Failure: Wayne McCormick's Holloway 1, 700 nsl 1400 wel blk 61, Parker CSL, abnd 180.

Cooke County — Failures: Nu-Enamel Oil Op. Co.'s J. A. Clement 1, 250 n 150 e of sec BBB&C Ry. sur A-168, but in N. Barnett sur, A-124, abnd 1705.

Norwood & Anderson's Thomason 2, 950 wel 3000 snl of T. Bell sur A-52, abnd 1121.

Jack County—Failures: Hanlon & Buchanan's Burt 1, 1094 nsl 233 ewl J. Anders sur A-15, abnd 600.

Hanlon & Buchanan's Munson 1, 1694 se of sel of E.P.I. sur, A-204, 700 sw of swl of SA&MG sur A-1177, but in T.C. Ry. sur, A-2046, abnd 600.

Throckmorton County — Failure: R. Olsen Oil Co.'s Cheney-Roberts 1, 330 out swc TE&L Co. sect 1621, Canyon 2510, Capps 3032, Bend 4152, abnd 4244.

Wichita County—Failure: V. T. Bolin et al's Seller 1, 330 ewl 990 nsl blk 296, Waggoner Colony Lands, abnd 2709.

Young County—Oil Discovery: F. P. Timberlake-H. M. Kelleher's W. J. Bryant-Rose-Hamilton 1, 3669 s 450 e of nec TE&L Co. 1369, but in Fractional TE&L Co. 3401, pump 15 bbls, sand 948-52, td 954.

Young County—Failures: H. M. Kelleher et al's Finch-Texaco 1, 527 nsl 633 ewl of ne 80-ac tr of TE&L Co. 38, abnd 868.

Davis Investment Co.'s Kindley 1, 330 nsl 1400 ewl TE&L Co. 471, elev 1068 ft, Bend 3805, Mississippi 4677, Ellenburger 4820, abnd 4854.

Morton & Elder's Hardin 1, 330 wel 1320 nsl R. D. Woodward sur, abnd 2127.

Mudge Oil Co.'s Deats-Touchstone 1, 467 nsl 330 wel of J. C. Cothan sur, abnd 3512.

NORTH TEXAS OUTPOST

Archer County — Burns-Benson Extension: Homer W. Snowden et al's Morrison 1, 1700 snl 1900 ewl TE&L Co. sect 1823, 1 mi ne of prod, higher structurally, elev 1137, Bend 4495, Mississippi 5220, flow 206 bbls 41-gr,

The OIL WEEKLY'S TRADING POST

USED EQUIPMENT FORUM

CLASSIFIED ADS . . . EQUIPMENT . . . SERVICES . . . PERSONNEL

FOR SALE

■ Standard Drilling Outfit, complete, A-1, steel rig. New Young 145-hp. engine, new 5000 ft. lines. $8500 or trade for Bucyrus Spudder. L. A. Bolte. Rt. No. 2, Brunswick, Ohio. W. Richfield 2423.

■ FOR SALE: 1 used Clark 12½" by 14" Super Two Cycle 150 H.P. 2 Cylinder 300 RPM Angle Gas Compressor Engine type RA-2S direct connected to 2-7" x 14" V.T.L. Compressor Cylinders and two extra 12" x 14" Compressor Cylinders. Box 376, Bradford, Pennsylvania.

■ FOR SALE—WHY PAY HIGH PRICES FOR DRILLING YOUR SHALLOW WELLS, when you can buy 1 Nat'l D'lg Machine 2A, 50' shear poles, Ajax 12 x 12 steam engine, 65 HP boiler, drilling and sand lines, 15½" to 5½" bits, stems and bailers. Also 2 Sup. Gas Engines, 35 hp, 4 cyc. and 2 Nat'l band wheel powers, pull rods, sucker rods. See Perry Rundell, 5 mi. S. Bryson, Jack Co., Texas.

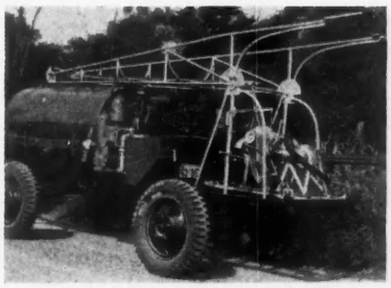
FOR SALE

50— 500 Barrels
10— 1,000 Barrels
20— 5,000 Barrels
4—10,000 Barrels

Heavy A.P.I. New closed bolted type steel tanks now located at Ogden, Utah. Can quote reasonable prices in order to move from present premises at once.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair County, Ill.

FOR SALE: Two Type A-3, E. L. I. Portable Shot Hole Drills mounted on special 4-wheel trailers with Myers mud pumps, folding derricks, and 250 gallon water tanks. Complete with Briggs and Stratton engines, swivels, kellys, "A" rod, hose, etc., ready to operate. Ideal for 50' to 100' holes in swamp areas. Used six months. Good mechanical condition. One drill is complete with take-down derrick, Moyno portable pump, and spare engine. Location—Shreveport. Heiland Exploration Company, 630 Giddens-Lane Building, Shreveport, Louisiana.



FOR SALE

Equipment from two natural Gasoline Plants

Contact
Box 220 — Ranger, Texas

FOR SALE

■ FOR SALE: At Aransas Pass, Texas; Three 180 RPM Clark Two Cycle Gas Compressors 16" x 20" Power Cylinders and 7¼" x 20" Compressor Cylinders, One 5½" x 20" Compressor Cylinder Type VS, One 13" x 20" Type "S" Double Acting Compressor Cylinder. Condition Very Good. Price $5000.00. Bryant & Saner, Box 107, Kerrville, Texas.

■ NEW 300 H.P. COMPRESSOR—Immediate shipment, one Clark 300 H.P. Model RA super 2-cycle right angle gas engine driven compressor equipped with two 15" compressor cylinders 14 x 14 with complete equipment. Brand new, never used. R. H. Armstrong, Box 1191, Texas City, Telephone 1190.

■ RANCH FOR SALE OR TRADE—Six hundred eight acres, short distance from well known Hill Country vacation center. Has about a mile of beautiful river front, a prolific native pecan valley with hundreds of trees; swimming, boating, fishing, deer and game; a recreational paradise. Trade for proven or producing oil royalty. Address owner, 230 East Huisache Street, San Antonio 2, Texas.

NEW PIPE FOR SALE

500' of 3½" X heavy seamless. Plain end.
2,000' of 2½" Standard 5.81# Seamless and Lapweld. Plain end.
850' of 3½" (4" O.D.) x heavy 12.50# Plain end.
60' of 5½" O.D. Standard 14.61# Seamless Plain end.
150' of 5½" O.D. X Heavy 20.77# Seamless Plain end.
220' of 6⅝" O.D. X Heavy 28.57# Seamless Plain end.
3,000' of 2" (2⅜" O.D.) XX Heavy 9.02# Seamless T & C.
5,000' of 2½" (2⅞" O.D.) XX Heavy 13.70# Seamless T & C.
1,500' of 3" (3½" O.D.) XX Heavy 18.56# Seam. P & C.
1,300' of 3½" (4" O.D.) XX Heavy 22.85# Seam. T & C.

All of Above pipe on our racks at Ceiling prices subject to Prior Sale. Wire or Phone. SEMINOLE PIPE & SUPPLY CO., Ph. 5951, Corpus Christi, Texas.

HELP WANTED

WANTED: Land man thoroughly experienced for Shreveport office of large independent integrated company. Give Qualifications in first letter. Address: Box 24, c/o The Oil Weekly, Houston, Texas.

■ SEISMOGRAPH INTERPRETERS — **Large, aggressive, expanding independent producing Company wants two experienced Party Chiefs or Supervisors to do geologic interpretation of reflection seismograph data in West Texas. Permanent job, good salary, housing guaranteed, permanent location. Write giving personal history, education and experience. Your replies will be kept confidential. Our men know of this ad. Box 22, The Oil Weekly, Houston, Texas.**

■ CORE DRILLER—Experienced core and water well driller to handle new Failing 1500 rotary rig in Rocky Mountain States. Attractive salary and bonus to the right man. Write giving full details on experience, past employment and personal data. Mountain States Exploration Drilling Company, 136 East Twentieth Avenue, Denver, Colorado.

LEASES, DRILLING, ACREAGE, ETC.

■ Experienced geologist has five surface structures subsurfaced four pay horizons two thousand to six thousand feet. H. P. Willis, Phone Logan 6-3151, 4638 Waneta Drive, Dallas, Texas.

■ WANTED to lease 160 acres in the Lake Saint John Field in Tensas Parish, La., for immediate drilling—Liberal terms if can drill now. M. J. Zollman, Bedford, Indiana.

SITUATION WANTED

■ **Graduate Petroleum Engineer, Texas University, ex-Army Captain, A.U.S., interested in securing job with progressive oil company. Address: Box 23, c/o The Oil Weekly, Houston, Texas.**

gor 400/1, 1000 gals acid Bend perf 4495-4520, td 5236, pb 4530.

EAST TEXAS WILDCAT

Van Zandt County — Failure: Delta Drlg. Co. et al's Martin 1, 867 wel 1000 nsl of A. T. Flowers sur, elev 535 ft, Pecan chalk 2530-2680 ft, Austin chalk 3575 ft, Woodbine 4510 ft, Georgetown 5330 ft, Duck Creek 6315, Paluxy 6599, Glen Rose 6870, 1st anhy 7485, massive anhy 8010-8188, Pettit 8805, Travis Peak 8923, abnd 9010.

SOUTH CENTRAL TEXAS WILDCAT

Gaudalupe County—Failure: United North & South Dev. Co.'s Mrs. Cora Mackey 2, 660 fr nel 610 fr sel 175-ac lse, 3 mi e Darst fld, 2 mi sw Day fld, Austin chalk 2500, Buda lime 2740, Edwards lime 2920, abnd 2932.

SOUTHWEST TEXAS WILDCATS

Duval County — Failure: Humble's Dallas Jt. Stk. Ld. Bnk. 1-C, 1263 fr wl 2196 fr nl F.C. & C.K. Gravis sur 6, 5755-ac "C" lse, abnd 3393.

McMullen County — Failure: O. D. Edwards' Annie Graves Dolph et al 1, 1650 fr nl 330 fr wl sect 27, Shumway sbdn Shiner Rch, C. Sandoval sur, 160-ac lse, abnd 1515.

Webb County—Failure: Edwin B. Cox-Jake L. Hamon's Clyde C. Marshall 2, 1320 fr nel 1320 fr nwl SM&S sur 334, 442.4-ac lse, band 2120.

LOWER TEXAS COAST WILDCATS

Brooks County—Gyp Hill Oil Discovery: Sun's Mary M. Lasater 4-B, 470 fr el 1780 fr sl GB&CNG sur 331, 799-ac lse, pay 4070, no perfs, flow 41.38 bbls 43.7-gr, ¼-in, gor 343/1, tp 30 lbs, td 4075.

DeWitt County — Failure: Sterling O&R Corp.'s Ernest Steinmann 1, 348 fr sly/nl 330 fr wly, el 92.7-ac lse, W. P. Tumlinson sur, 2 mi s Yoakum fld disc, abnd 9017.

Jim Wells County — Distillate Discovery: Shell's Wm. Van Hoogenhyze 1, (OWWO) 660 fr n&el lot 6, blk 10 Burton & Danforth sbdn of Parrita Rch, 232.65-ac lse, de la Garza Gr, pay 9023, perf 90 shots 9023-38, 48 shots at 9060-69, flow 108 bbls 48.2-gr cond, 17,750,000 gas, ¾-in, tp 3200 lbs, td 10,086.

Karnes County — Failure: H. R. Smith-Skinner & Eddy Corp.'s Mrs. Adeline Weddington 1, 467 fr se&swl 1497-ac tr on 160-ac squ. lse, Geo. Elliott sur 138, abnd 4170.

Nueces County—Failure: H. R. Smith-W. C. McBride's Clara Driscoll 1, 467 fr w&nl 448.18-ac lse, n cor Jose A. Cabasos sur, ¾ mi e ne Brayton fld, 1 mi w sw Gandy fld, abnd 8305.

LOWER TEXAS COAST OUTPOST

Jackson County—Stewart Failure: Monday Oil Co. et al's Vina Thomas 1, 467 fr s&el 280.8-ac lse, Geo. Sutherland sur, 4000 nw Texas Co.'s Groberg 2, on nw flk, abnd 5080.

POSITION WANTED

■ POSITION WANTED: **Veteran, graduate geologists, service experience in electronics. Wants Permanent Location. Address: Box 16, c/o The Oil Weekly, Houston, Texas.**

NOTICES

■ **WANTED: Operators to finance and further develop proven and semi-proven oil and gas properties in Montana.**
Hamilton & Hamilton, Inc.
Box 1605, 535 Ford Bldg.
Great Falls, Montana.

MONTANA

Fish in the wildest region in the United States. Between Yellowstone and Glacier National parks, on top of the continental divide . . . unsurveyed . . . heart of the game country . . . fish for Rainbow, Native and Brook Trout in lakes and streams accessible only by saddle horse.

TIMBERLINE CAMP OPENS JULY 1ST

Complete Trip

$500.00

Everything Furnished

A Trip You Will Never Forget.

Make reservations now. Write for information. Business Agent, 5X Ranch, Box 2487, Casper, Wyo.

QUICK REPAIRS ON
CONDENSERS
and
HEAT EXCHANGERS

If you need condenser or heat exchanger repairs **in a hurry** call us. We specialize in fast, high quality work.

25 Years Successful Experience.

GULF ENGINEERING CO., INC.
"Service Not Promises"
M & M BUILDING — HOUSTON, TEXAS
916 S. PETERS STREET — NEW ORLEANS, LA.

BETTER
Steel Forgings for
CHRISTMAS TREE
FITTINGS
BEAUMONT
WELL WORKS COMPANY
BROOKE TODD, General Manager
INCORPORATED
BEAUMONT, TEXAS

ANCHOR WELD
economical - permanent

Mechanical and Low Temperature, Invisible Welding for Industrial Motor Blocks, Cylinder Heads, Pumps and Machinery without Preheating or Dismantling.

Work done in our plant or in the field

ANCHOR WELD
REPAIR SERVICE
R. R. Fudge, Owner
718 Jefferson Avenue
C. 4-4339 — HOUSTON 2, TEXAS

WILDCAT STARTS

ARKANSAS

Union County: Gay Mabee et al's Union Saw Mill 1 c sw nw 31-18s-11w, 6300-ft or Smackover test.

CALIFORNIA

Kern County: B&R Oil Co.'s Poso 3, 14-27s-27e, McVan area, lcn.

Beverly Trading & Exploration Co.'s Anderson 1, 31-29s-21e, Temblor area, drlg.

Hancock Oil Co.'s Jobe Community 1, 7-30s-29e, Edison area, ru.

Wilshire Oil Co.'s Kalloch 1, 11-25s-18e, Devils Den area, ru.

Solano County: Standard's Kirby Community 3, 24-4n-1w, Kirby Hills area, lcn.

Tulare County: Pacific Central Oil Co.'s Finch 13, 6-24s-23e, Trico area, lcn.

Ventura County: Texas Co.'s Kern 13-SW-18, 18-4n-17w, Del Valle area, lcn.

ILLINOIS

Bond County: C. C. Hutchins' Dieckman 1, ne nw ne 26-4n-2w, lcn.

Coles County: Schoenfeldt-Hunter & Kitchens' Meyer 1, nw nw sw 35-13n-8e, drlg.

Lawrence County: Geo. S. Engle's Grounds 1, ne nw ne 22-2n-12w, drlg.

Steve Zanetas et al's Bank 1, nw ne sw 23-3n-11w, drlg.

Richland County: Texas Co.'s Ashmore 1, sw sw se 11-4n-10e, lcn.

KANSAS

Barton County: Black-Marshall's Klug 1, se se se 28-17s-13w, c&p.

Butler County: O. J. Connell et al's Covert 1, sw nw sw 3-27s-5e, mim.

Ellis County: Mazda Oil's Henderson 1, c e½ se ne 22-11s-18w, lcn.

Mouser Drlg. et al's Moore 1, sw sw nw 19-15s-19w, mim.

McPherson County: J. M. Huber Corp.'s Sinclair 1, (OWWO) sw sw sw 25-19s-1w, otd 3420, rur to clean out old hole.

Rooks County: Goodpasture's Bice 1, nw nw sw 10-10s-17w, lcn.

Sedgwick County: Helmerich & Payne et al's Williams 1, sw sw sw 18-25s-2w, mim.

WESTERN KENTUCKY

Butler County: Olstrum et al's Gardner 1, 22-I-32, lcn.

Henderson County: Herndon Drlg. Co.'s Barrett 1, 23-P-23, drlg.

McLean County: Sohio Chester's Smith 1, 19-N-27, lcn.

Webster County: W. R. Dougherty et al's Chamberland 1, 1-M-25, drlg.

NORTH LOUISIANA

Franklin Parish: H. L. Rowley et al's Leo Rogers 1, c sw nw 15-16n-9e, 5000-ft test.

Sabine Parish: B. L. Jones-W. F. Newton's J. K. Phares 1, 9-5n-12w, lcn.

R. B. DeWitt's Sabine Lbr. Co. 1, 21-7n-13w, 2600-ft test.

SOUTH LOUISIANA

Avoyelles Parish: Avoyelles Pet. Corp.'s R. E. Bourdelon 1, 2370 fr nec 56-2n-4e, 9000-ft test.

MICHIGAN

Allegan County: C. W. Kendall's Nyberg 1, sw se sw 28-1n-11w, lcn.

Arenac County: Sohio-Nat. Assoc.'s Brennon 1, se ne se 14-18n-4e, dr.

Isabella County: West Michigan Consumers Co.'s Lake 1, se nw ne 30-13n-6w, dr.

Kent County: Byron MacCallum's Stream 1, ne ne nw 20-10n-12w, dr.

Osceola County: Ashby Drlg. Co.'s Ferguson 1, ne sw nw 15-18n-7w, dr.

NEW MEXICO

Lea County: Union of Calif's State 1-B, 1980 nsl 660 ewl 3-21s-34e, lot 5, 3900-ft San Andres test.

OKLAHOMA

Hughes County: Public Service Co.'s Drake 1, c n½ nw ne 13-9n-12e, c&p.

Kay County: Earl Wakefield's Henke 1, ne ne se 31-25n-1w, drlg.

Lincoln County: Mid Continent's Florer 1, ne ne ne 4-15n-6e, rur.

Pittsburg County: Public Service Co.'s Jones 1, c nw se 36-8n-13e, drlg.

Pottawatomie County: Ashland Ref. Co.'s Guderian 1, se nw nw 12-10n-4e, lcn.

WEST TEXAS

Terry County: J. D. Hunter et al's Pope Pool 1, se se se C&M sec 4, blk D-14, 5500-ft San Adres test.

TEXAS PANHANDLE

Collingsworth County: Bridgeport Oil Co.'s Ann C. Hughes 1, se se se H&GN Ry. 78, blk 11, lcn.

WEST CENTRAL TEXAS

Coleman County: H. T. Owen-P. H. Ryan et al's G. O. Cresswell 1, 990 snl 1980 wel GH&H RR. sect 96, blk 2, 2700-ft rotary test.

Jones County: V. E. Autry-Ernest L. Wilson-Paul Steed's W. A. Minter 1, 710 snl 330 wel S.P. Ry. sur, 3500-ft rotary test.

Jones-Stasney-Groover & McMordie's Alexander 1, 900 snl 300 ewl H. Martin sur 12, lcn.

R. H. Roark-Hooker et al's L. R. Cade 1, 330 out nwc Labor 4, lge 150, DeWitt CSL, 3200-ft cable test.

NORTH TEXAS

Archer County: K. R. March et al's J. Darilek 1, 1716 nsl 933 ewl sect 2410, TE&L Co. sur, 1425-ft rotary test.

H. R. Theck et al's C. R. Seale 1, 150 out of sec of 83-ac lse blk 144, J. W. Harris sbdn, 1500-ft rotary test.

F. P. Timberlake-H. M. Kelleher's L. F. Wilson 1, 150 out nwc lot 923, ATNCL sect 85, 1600-ft rotary test.

Clay County: G. E. Kadane & Sons' F. Bunting-Shell 1, 330 wel 1850 nsl w½ sect 2608, TE&L Co. sur, 1½ mi e of Antelope fld, 3200-ft cable test.

Cooke County: H. W. Little et al's Ed. Williams 1, 30 nsl 2298 ewl of 176-ac tr, Harriet Nail sur, 1500-ft rotary test, sp.

Cottle County: W. H. Peckham et al's U. L. Wilie 1, 660 out sec sect 2, A. A. Neff sur, 6000-ft rotary test.

Fannin County: McLaughlin Bros.' J. P. Harper 1, 200 n 2000 w of m/e/sec of George Dameron sur, Ellenburger test.

Wichita County: Bell O&G Co.'s A. Kasper 1, 330 out nwc of 150-ac BS&F sur A-334, sect 1, 2 mi nw Clara, 3500-ft rotary test.

D. H. Bolin et al's A. J. Holtzen 1, 750 snl 1500 wel of 200-ac tr, Lewis Powell sur A-242, 2 mi ne Clara, 2100-ft rotary test.

Young County: Henry Craig et al's H. Hennig 3, 450 wel 208 nsl of nw TE&L Co. 65, 1100-ft rotary test.

EAST TEXAS

Navarro County: Woodbine Oil Corp.'s J. H. Burke 1, 1500 fr nw 670 fr swl 110-ac tr, or 1900 fr ms/sw 800 fr sel of Thomas Edmondson sur, 1 mi n of Powell, rur for 2000-ft test.

Temple Hargrove et al's Guy E. Wallace 1, 300 fr sel 500 fr swl of 40-ac tr, or 300 fr sel 900 fr m/ely/nel of John Jones sur, near old Richland gas field (new pay test), 6300-ft test.

UPPER TEXAS COAST

Ft. Bend County: W. L. Goldston's Louise Kramer 1, 1650 fr swl 330 fr sel 160-ac tr and sect 19 H&TC sur A-215, 3 mi nw Needville prod, 7000-ft test.

Hardin County: Houston Oil Co. of Tex.'s Houston & American Republics Fee 1, 4723 fr sl 371 fr el Thos. Penny sur, 640-ac tr, 18,350 w sw nearest Village Mills prod, 10,000-ft test.

Harris County: J. Leonard Davidson's Joseph F. Meyer 1, 1200 fr wl 1400 fr el 330 fr sl 320-ac tr, John Ely sur, 7500-ft test.

SOUTH CENTRAL TEXAS

Caldwell County: Ellmag Oil Corp.'s T. S. Watts 1, 1658 fr nel 91-ac lse, E. Curtis sur, wod.

SOUTHWEST TEXAS

Starr County: Henshaw Bor-Coastal Ref.'s Sanchez 1, 4620 fr nl 330 fr wl J. Poitevent sur 343, 3 mi ne Margo fld, 5000-ft test.

Webb County: Long Bors. Drlg. Co.'s E. Leal 1, 660 fr el 1802 fr nl sur 671 and 200-ac lse, 3 mi w Kohler gas fld, 2000-ft test.

LOWER TEXAS COAST

Karnes County: Seaboard Oil Co.'s Banduch 1, c 77-ac tr, A. Hernandez sur, ne Hobson fld, ru Wilcox test.

Refugio County: Barnsdall's Mrs. E. T. Morrow 1, 467 fr n&el 97.1-ac lse, in nec Ed. Perry sur, 1 mi s McFaddin gas area, 1¼ mi sw McFaddin oil prod, 7200-ft test.

Continental's Jas F. Welder Heirs 1, 1200 fr ely/el 330 fr nly/sl 25,449.82-ac lse, Jas. Powers-Jas. Hewitson sur, 6500-ft. test.

San Patricio County: Jones & Morgan's O. Merrill 1, 318 fr e&wl 330 fr sl 29-ac lse, J. J. Welder sbdn, 3500-ft test.

Victoria County: Sterling O&R Corp.'s J. J. Welder 1-C, 4230 fr swl 785 sel 3980.9-ac "C" lse, Phillip Graves Lge, dr 1249 on 7000-ft test.

Taylor Ref. Co. et al's Leon Raaz 1, 990 fr nwl 330 fr nel Louis Kratz sur, and of 240-ac lse, 1½ mi sw E. Teleferner fld, 5500-ft test.

Texas Field Named

The name "Sliva" has been given the field discovered by Bridwell Oil Company's H. Sliva 1, F. O. Skidmore Survey 4, Bee County, Texas, according to Martin Matson, chairman of the Oil Field Nomenclature Committee of the South Texas Geological Society.

SQUEAKS from the BULL WHEEL

Life Is Like This

Pretty girls,
One often notes,
Get precious pelts
Off bald old goats.

Short Life

"Doctor, what can I do to have soft, beautiful hands?"

"Nothing, Madam, and do it all day long."

Poet's Nook

There once was a girl who was buxom
At dances she seldom got stuxom
But wherever she'd go
The boys that she'd know
Would always get her to truxom.

Enc—Enc Ack-choo!

A bunch of germs were hitting it up
In the old bronchial saloon;
Two bugs in the edge of the larynx
Were jazzing a ragtime tune.
Back in the teeth, in a solo game
Sat dangerous Ack-Kerchoo—
And watching his pulse was his light-o'-love,
The ladys that's known as Flu.

Now He Rides Free

A Scot was arguing with the conductor about the price of his ticket. Finally the disgusted conductor snatched up the Scot's suitcase and tossed it off the train into a river.

"Hoot, mon, "screamed the Scot. "First you try to rob me, and now you've drowned my little boy!"

With Both Hands, Maybe

A painter who was painting the ceiling in an insane asylum was approached by one of the inmates. "Say, mister, have you got a good hold on that paint brush?"

"Sure. Why?"

"Well, better hang on tight. I'm going to move this ladder."

Pad the Palm

"Will you ever forget our glorious week-end at Palm Springs?" the employer asked his secretary.

"That depends on what I'm offered."

This Curious World

Maybe the reason gentlemen prefer blondes is that blondes know what gentlemen prefer.

A rattlesnake is an eel with a crap game in the rear.

Gold-digger: A human gimme pig.

Love is a condition that starts when she sinks in your arms and ends up with your arms in the sink.

Crest-Fallen

Here is one on a member of THE OIL WEEKLY staff too good to keep quiet!

Not long ago the staff member was in Central America and while visiting a ranch of considerable proportions was shown a Holstein bull the ranch owner had recently purchased in the United States. The bull was a fine animal and much conversation took place, ending with the promise of the ranch owner to show the S.M. the pedigree of the bull when they returned to the Casa Grande. Later when the S.M. and the ranch owner, with other guests, were having cocktails on the ranch veranda the owner brought out an envelope and said something in Spanish to the S.M., who misinterpreted the speech.

"Oh," exclaimed the S.M., "the pedigree of the bull!" And was his face red when the guests burst out laughing and it developed that the ranch owner was about to show the coat-of-arms of his family—one of the oldest and most prominent in Spain and Latin America!

Now He's Jumpy

"This afternoon we shall take Mr. Frog apart and see what makes him croak," said the Professor to his zoology class. "I have a frog in my pocket to be used as a specimen."

He reached into his pocket and drew out a paper bag, which he emptied onto the table. Out rolled a badly squashed ham sandwich.

The Professor mopped his brow. "My goodness," he stammered, "I distinctly remember eating my lunch."

Ixnay, Ammitday!

Someone wired a government bureau asking whether hydrochloric acid could be used to clean a given type of boiler tube. The answer was, "Uncertainties of reactive processes make use of hydrochloric acid undesirable where alkalinity is involved."

The inquirer wrote back, thanking the bureau for the advice, saying that he would use hydrochloric acid. The bureau wired him, "Regrettable decision involves uncertainties. Hydrochloric acid will produce submuriate invalidating reactions."

Again the man wrote thanking them for their advice, saying that he was glad to know that hydrochloric acid was all right. This time the bureau wired him in plain English, "Hydrochloric acid," said the telegram, "will eat hell out of your tube."

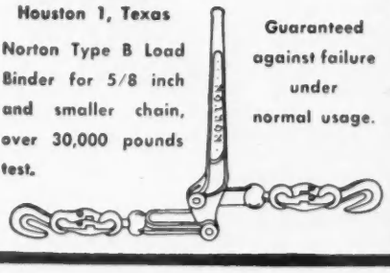
LOAD BINDERS
FOR OIL FIELD HAULING

Norton *drop forged, heat treated steel* load binders (Boomers) for heavy duty service are now available for immediate delivery. Order them through your regular jobber.

NORTON

EQUIPMENT CO., Inc.
P. O. Box 1185
Houston 1, Texas

Norton Type B Load Binder for 5/8 inch and smaller chain, over 30,000 pounds test.



Guaranteed against failure under normal usage.

"Best Bet Yet"

This reinforced disc of natural rubber has many time and money saving advantages. Reduces fire hazard—Reduces costly fishing —Cleaner tubing and floors —Making for safer working conditions—Protection to crew—Automatic action.

See Composite Catalog

Patterson-Ballagh TUBING WIPER

Los Angeles 1 • Houston 10 • New York 6

MEN IN THE INDUSTRY NEWS

K. A. Simmons, who has been division exploration manager for W. C. McBride, Inc., in charge of operations in Illinois, Indiana and Kentucky, with headquarters in Centralia, Ill., since 1938, has resigned. He will be succeeded by **Kenneth W. Lewis,** who will maintain the division headquarters at Evansville, Ind. Simmons has been in the employ of W. C. McBride, Inc., for almost 16 years, directing exploration activities in Tyler, Texas, and San Antonio before being transferred to Illinois. Lewis has been in the geological department for W. C. McBride, Inc., in Illinois and Indiana since early 1940.

»

H. F. King, Ardmore, Okla., president of the National Oil Scouts and Landmen's Association, announced completion of plans for the national convention in Jackson, Miss., May 23-25. Registration will open at Hotel Heidelberg May 23 at 10 a.m.

»

James Noel, assistant attorney general and head of the oil, gas and rate division of Texas' law office, has resigned. Noel, formerly district attorney in Dallas County, will enter private law practice with the Houston firm of Butler, Binion, Rice and Cook. He returned last year after three years with the Navy.

»

Nicholas A. D'Arcy, Jr., sales engineer for Charles W. Carter Company, Los Angeles, spoke May 9 before the Los Angeles Basin Junior Section of the American Institute of Mining and Metallurgical Engineers on "Hydraulic Couplings and Torque Converters."

»

W. O. Briscoe, Jr., member of a Cities Service Oil Company seismograph crew at Shawnee, Okla., has been presented with the President's medal, highest ranking award of the National Safety Council, for saving the life of a fellow worker. When **Ralph E. Brown,** Seminole, Okla., was knocked down by lightning near his dynamite-laden truck, Briscoe and **Charles Spivey,** another seismograph crew member, carried him to another truck, while Spivey drove, Briscoe applied artificial respiration.

»

N. E. Meyer was appointed sales engineer of the Wilson-Snyder Manufacturing Division of Oil Well Supply Company, a United States Steel subsidiary. He will have charge of the division office in New York. Meyer has been with the Wilson-Snyder organization for 18 years, serving in various capacities in the manufacturing, order and sales departments in the Braddock, Pennsylvania, home offices. He is a graduate in mechanical engineering of Carnegie Institute of Technology.

N. E. Meyer

Harold E. Cooper, associated for 14 years with **Fred E. Cooper,** has been appointed general manager of the organization. He began as a field salesman with the firm in 1932, and in 1936 became eastern division manager. In 1937, he was made foreign sales representative, and for the following few years visited most of the world's producing oil fields. He was transferred to the Tulsa headquarters in 1943 to be in charge of machinery sales, which position he held until his recent appointment.

Harold E. Cooper

»

A. W. Thompson and **H. S. Cole, Jr.,** both of Thompson & Carr, Inc., Houston drilling firm, and **Fred W. Bates** of Lafayette, La., have incorporated the Avoyelles Petroleum Corporation, with headquarters in Houston.

»

Dr. J. Brian Eby, consulting geologist of Houston, discussed "The Oil Situation and General Conditions in Northern Europe" before the Tulsa Chapter of Nomads.

»

James E. Martin, a lubrication engineer of the Mid-Continent Petroleum Corporation, has been transferred from Milwaukee to Oklahoma City.

»

Dr. Horace G. Richards, associate curator of geology and paleontology in the Academy of Natural Sciences of Philadelphia, addressed the Tulsa Geological Society recently. Dr. Richards is making a tour under the auspices of the American Society of Petroleum Geologists.

»

Frank H. Dunn, president of Wilcox Oil Company, Tulsa, was reelected to that position. All other officers of the company were reelected, as were all directors at a previous meeting.

»

Hugh Story, former West Texas scout for Ohio Oil Company, has joined Cities Service Oil Company as assistant landman for the Midland, Texas, district.

»

Charles A. Shaw, geologist on the West Texas staff of Forest Oil Corporation, has resigned to operate as a consultant, with headquarters at Midland, Texas.

»

George C. Clark, assistant district geologist in West Texas, has been transferred from Midland to Amarillo as Texas Panhandle district geologist, succeeding **Walter G. Moxey,** who resigned.

»

Fred L. Yates has been employed as executive secretary of the new Oklahoma Liquefied Petroleum Gas Association. Yates formerly was secretary of the Conroe, Texas, Chamber of Commerce.

Harry (Doc) Kniseley of The Carter Oil Company's public relations staff, was elected vice president of the National Council of Industrial Editors in Boston May 11. Kniseley was recently named president of the Southwestern Association of Industrial Editors, a regional organization of 500 members in 24 states and Canada.

»

Dr. Robert B. Mears, head of the chemical section of the development division, Aluminum Company of America, spoke on "Corrosion and Its Relation to the Oil Industry" before the Texas Chapter of the American Society of Metals, which met in Houston May 15.

»

Peter Prayson, chief research metallurgist of the Crucible Steel Company of America, Harrison, N. J., spoke on "The Heat Treatment of Steels in Relation to Their 'S' Curves or 'TTT' Curves" before the Tulsa chapter, American Society of Metals.

»

B. W. Rogers has been appointed to represent Hammond Iron Works in the Akron, Ohio, district, and with **J. G. Prentiss** will represent the complete line of Hammond services of designing, fabricating, and the erecting of steel storage tanks for liquid and dry storage, and steel and alloy plate work.

»

P. E. Loye, for several years a vice president and director of Reda Pump Company, Bartlesville, Okla., has resigned to join the recently formed Knowlton Engineering Company, Oklahoma City. Knowlton is a partnership of **Don R. Knowlton,** former manager of Phillips Petroleum Company oil interests, and **Frank M. Porter,** Oklahoma City.

»

Dave Breith, former machinery engineering representative for Bethlehem Supply Company, has been appointed the West Texas-New Mexico district manager of the General Oil Well Service, Inc., which specializes in well completion and cleanout service, with office at Midland, Texas.

»

Matthew R. Rosse has been appointed export manager for the Colorado Fuel and Iron Corporation, and all divisions and subsidiaries, specifically Wickwire Spencer Steel Division, the Colorado Division, and the California Wire Cloth Corporation. His headquarters will continue to be in New York. Rosse has for 25 years been engaged in the business of exporting steel products and industrial equipment. He has traveled extensively, particularly in Latin America and Europe. Rosse previously was export manager of Wickwire Spencer Steel Division.

Matthew R. Rosse

Ferdinand W. Roebling, III, has succeeded **Charles M. Jones** as vice president in charge of engineering for John A. Roebling's Sons Company, Trenton, N. J. Jones has become vice president

F. W. Roebling, III

Charles M. Jones

in charge of public and industrial relations. Both are on the company's board of directors. Roebling became an engineer with the company upon his graduation from Princeton in 1933, and served with the Army Engineers from 1940-1945. He is the third great-grandson of John A. Roebling to actively engage in the management of the company.

»

C. P. Parsons, vice president of Halliburton Oil Well Cementing Company, is in the Near East after a stay in Paris. From Paris he planned to visit Egypt, Saudi Arabia, Kuwait, Iran and Iraq.

»

R. L. (Tony) Middleton has joined the sales staff of D. W. Onan & Sons as factory representative, with headquarters in Dallas. He has had 20 years of experience in the engineering and selling of oil field equipment.

»

C. C. McDermond has been appointed Venezuela and Colombia representative of the welding fittings division of Tube Turns, Inc., with headquarters at Maracaibo, Venezuela. McDermond joined The Texas Company in 1914, became chief scout in Mexico, and later was placed in charge of wildcatting operations in Panama. He went to Venezuela as representative of the Creole Syndicate, whose holdings were being developed by the Venezuelan Gulf Oil Company, from 1925-1928. He resigned to establish a scouting service, which he continues to operate, founded a map making firm, Compania Cartographia, and assisted in establishing and managing Pan American Airway's operations in western Venezuela, where he is also business representative of many American manufacturers.

C. C. McDermond

Lynn C. Converse has been elected vice president of Braden Steel Corporation. He will be in charge of manufacturing Braden sectional steel prefabricated buildings and will supervise all plant facilities. Prior to assuming his present position he was in charge of the research and development department and since January, 1945, has been production manager.

»

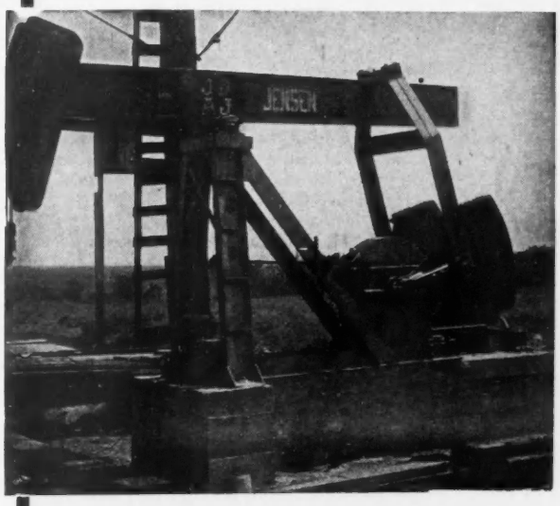
Jake Taylor, head of the Taylor Drilling Company has announced that the office and equipment of the firm will be moved from Centralia, Ill., to Montana.

E. J. Robishaw, sales engineer for A-1 Bit & Tool Company, Houston, discussed "The A-1 Rotary Type Side Wall Core Barrel" before the Tulsa Geological Society.

»

Dr. Horace G. Richards, associate curator of geology and paleontology of the Philadelphia Academy of Natural Sciences, spoke on "Subsurface Stratigraphy of the Southeastern Atlantic Coastal Plain" before members of the Oklahoma City Geological Society.

TAKE A TIP ON A SURE-FIRE BET . . .



Once the well is in, there's still a gamble on pumping equipment. To get your full share of the profit, pumping equipment should be reasonably priced, dependable, inexpensive to operate and designed to last for many years.

JENSEN has spent 26 years manufacturing equipment that meets these requirements. Producers all over the world have found this out and are getting the extra edge of profit that JENSEN furnishes.

Don't gamble any part of your profit—take a tip on a sure-fire bet—investigate JENSEN units now by talking to our customers or your JENSEN dealer. If this is not convenient, drop us a line—we'll be glad to send complete information.

JENSEN BROTHERS MANUFACTURING CO.

. . . Coffeyville, Kansas, U.S.A. . . .

EXPORT OFFICE: 50 CHURCH STREET, NEW YORK CITY

FRED M. LINK

Preferred

FM Radio
Communications Equipment

Solve your tough communications problems by using this equipment. Proved during war and doubly preferred by Communications men in all branches of the oil industry.

Ask for **FRANK CONWELL,** *Engineer*

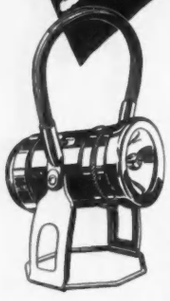
Houston Radio Supply Co., Inc.
Clay at La Branch Phone C-9009
HOUSTON, TEXAS

Safety & Thrift

COMBINE IN THIS

FOCAL-RAY EMPIRE

LANTERN
(MODEL 940 UL)



● OIL-MEN, everywhere, approve this *spark-proof* FOCAL-RAY Lantern, with its wide adjusting range—from a beam to a floodlight at one turn of the lens. Flexible Directional Beam. Wireless Sliding Switch. Easy Grip Handle. Runs on 6-Volt Lantern Battery.

Listed and Approved by Underwriters' Lab., Inc. Report No. E14729

Carried by your Supply Distributor, or write for immediate delivery.

$4.00 LIST PRICE

THE METAL WARE CORP.
TWO RIVERS, WISCONSIN

WELGEL

TOP QUALITY COLLOIDAL BENTONITE

Buying WELGEL, you are getting not only the best bentonite, but also security for dependability and prompt delivery service.

Distributor

MUDRITE CHEMICALS
P. O. Box 1013
Houston 1, Texas

Deaths

Frank Raymond McGrew, retired executive of Standard Oil Company of Louisiana, died May 11 in Shreveport after a long illness. McGrew began as a pipe line laborer in the Spindletop boom in 1903. By 1919 he had become superintendent of Standard's pipe lines in the Shreveport area, and three years later was named general manager of all pipe line operations. Upon incorporation of Standard Pipe Line Company he became vice president and general manager, and finally president in 1925. When the corporation was merged with Standard of Louisiana in 1936, McGrew was elected vice president and general manager in charge of pipe lines, and was also a member of the board of directors. He retired in 1937 because of ill health.

F. R. McGrew

Frank H. Hollow, 43, president of the Bridgeport Oil Company, Inc., Wichita, Kansas, died of a heart attack, May 10, in Wichita. A native of Cuba, Mo., Hollow moved to Wichita 16 years ago and was active in oil business in Kansas, Texas, Oklahoma, New Mexico and Michigan, where many Bridgeport holdings are located. He was also president of the Western Lithograph Company. He founded the Hollow Drilling Company in 1937 with **C. M. Toews,** now treasurer of Bridgeport Oil, and opened the West Silica pool in Rice County, Kansas, in 1938. Hollow first entered the oil business in 1922 with the Shell Oil Company.

J. B. Underwood, 68, treasurer of the Unit Rig and Equipment Company, Tulsa, died May 12 of a heart attack. A graduate of the Missouri School of Mines at Rolla, Mo., Underwood moved to Tulsa from the Granby-Joplin, Mo., area in 1941, taking up duties as treasurer of the company. He was in the banking and mining business in Granby before moving to Tulsa.

Earl V. Kesinger, 50, former Bartlesville, Okla., oil man, died in Wilmette, suburb of Chicago, May 13. He was vice president of the America and Texoma Natural Gas companies. He moved to Bartlesville in 1917 to join Cities Service Oil Company as a junior engineer. He moved to Illinois in 1930 to take the position of chief engineer for the Natural Gas Pipe Line Company of America.

Leslie Olson, head of production and sales of propane and butane tanks for Black, Sivalls & Bryson, Inc., Oklahoma City, died May 5. He had been with the firm since 1932.

George Calvert, 69, of Broderick & Calvert, Inc., Fort Worth firm that discovered the Harper field and pioneers in the development of other West Texas areas, died May 9 of a heart attack while visiting his daughter at Fayetteville, N. C. He was a veteran of the Spanish American War, and engaged in newspaper work for some years. He entered the oil business as an independent operator in the Gulf Coast, later participating in the development of the Breckenridge, Texas, and Smackover, Ark., fields.

George Calvert

A. J. Grace, 42, Dallas operator, was fatally injured May 9 in an auto accident near Grand Prairie, Texas.

J. D. Felton, 46, West Texas driller, died May 11 at San Angelo, Texas.

Robert H. Bartlett, 65, pioneer Oklahoma oil man, died in Tulsa May 11. Bartlett for many years was an active Tulsa civic leader, and at the time of his death was a director of the Fourth National Bank and chairman of Union Wire Rope Company.

Vere B. Edwards, president of Dravo Corporation, died May 8 of cerebral occlusion. Edwards, 56, had been president of Dravo since 1934. He joined the firm in 1912 upon his graduation from Lehigh University.

E. Leachman, 74, retired Carter Oil Company executive, died May 11 at Los Angeles. Leachman, after being in charge of the treasury department of the company 18 years, retired in 1933. He moved to Tulsa in 1906, residing there until his retirement.

Karl Fogle Vaughan, 49, stock clerk for The Texas Company in Houston for 23 years, died May 15.

James Greer Young, 38, of Mont Belvieu, Texas, drilling superintendent for the Texas Gulf Producing Company, died in Columbus, Texas, May 14.

BE SURE TO CHECK THE

TRADING POST SECTION

ON PAGE 89 OF THIS ISSUE

Dowell Incorporated's Tulsa Facilities Greatly Expanded

During the past year, Dowell Incorporated, Tulsa oil field and industrial chemical service company, has carried on extensive development of its site in northeast Tulsa, with four major installations, including a plastic manufacturing plant, a chemical storage warehouse, a truck assembly and spare parts depot, and a physical research installation.

The plastic plant, only one of its type in the United States, is devoted to manufacture of certain types of plastic used in oil field plugging operations, the chemical storage warehouse provides a central source of supply for all Dowell stations; the truck assembly shop is used for assembly of all mobile equipment, and the physical research building, now in final stages of construction, is designed for work on tools and apparatus as well as chemical materials used in conjunction with new types of oil field service operations.

War Assets Administration Offers Wire, Cable for Sale

The War Assets Administration has announced for sale a large inventory of government surplus electric wire and cable, made by leading manufacturers for war purposes. Some types and sizes are standard and in conformance with underwriters' code. Use of the wires and cables are suggested in circuits for power and light, telephone and signalling, ignition and control, battery charging, instrument and switchboard wiring, welding. Information on types and sizes or inspection of material may be requested from the regional offices of the War Assets Administration.

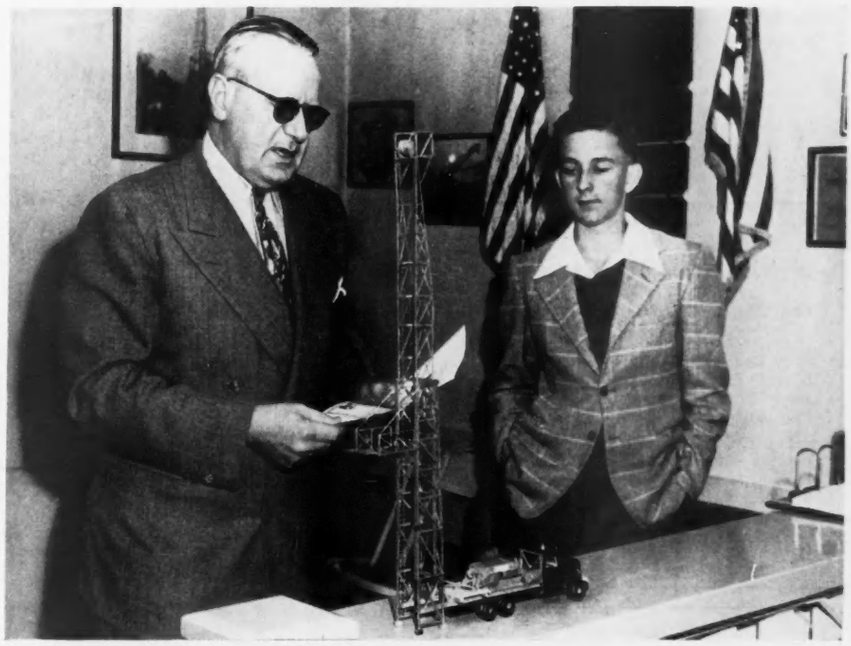
The Industrial Division of Real Property of the War Assets Administration is also prepared to sell or lease three government-owned oil refineries, subject to the rights of the parties in possession. The refineries are Smith's Bluff, Texas, operated by The Pure Oil Company, with a rated capacity of 1200 barrels per day of aviation alkylate; Texas City, Texas, operated by Pan American Refining Corporation, with a rated capacity of 2540 barrels of isopentane per day; Duncan, Okla., operated by Associated Refiners, Inc., and rated at 4200 barrels of 100-octane gasoline daily. Information regarding these refineries, and other plants soon to be available for lease or sale, is available in the Administration's offices, Washington 25, D. C.

Le Roi Announces Organization Of New Division in Cleveland

C. W. Pendock, president of Le Roi Company of Milwaukee, has announced the organization of the Cleveland Division. The Division will be headed by Russell R. Morgan, former officer of the Cleveland Rock Drill Company, and will contain a staff of development and design engineers, metallurgical and heat treating specialists.

Distribution of Cleveland Division products will be integrated with the company's general sales program. Export sales will be handled by Le Roi's foreign sales department, and through distributors located in every principal country. District offices in the United States are at New York, Washington, Birmingham, Tulsa, San Francisco and Milwaukee. Le Roi Company's Centaur Division at Greenwich has recently completed substantial plant expansion.

Tulsa High School Student Wins Franks Award



Billy Dean Pendergraft, Tulsa high school student and son of a Franks Manufacturing Corporation inspector, was presented with a $50 Victory Bond by Carl White, Jr., company president, after building a model of one of the giant Franks' telescoper-derrick truck-mounted oil well serving units. The model, built to scale, is exact in every detail and required three months to complete.

Hammond Representative Named

The Hammond Iron Works of Warren, Pennsylvania, will be represented in the Pittsburgh district by the D. D. Foster Company, 412 People's Gas Building, Pittsburgh. D. D. Foster and A. H. Stroud, operators of D. D. Foster Company, will carry the full line of Hammond services of design, fabrication and erection of tanks and steel and alloy plate work.

Sales Office Opened in Denver By Continental Supply Company

Continental Supply Company has opened an office in Denver. This latest Continental sales point is in the U. S. National Bank Building. George A. Stout is representative.

Sterling Address Change

The Sterling Engine Company has announced a change of New York address, from 900 Chrysler Building to 401 Fourth Avenue, New York 16. The enlarged quarters will have a show room for the exhibiting of Sterling marine and industrial engines.

CURTIN CENTRIFUGES

Give You Quick, Accurate Results With *Less Effort . . . at Less Cost*

Simple in design, ruggedly built for heavy duty service. Gear ratio and throw of crank produce required speed with no strain. Heads and cranks of 100 CC and 15 CC machines are interchangeable. Meets A.S.T.M. *Standard Method D-96 and A.P.I. Code No. 25 requirements.* Ask for full details.

W·H·CURTIN & CO. Inc.
HOUSTON U·S·A TEXAS

Attention Manufacturers of CHEMICALS AND CHEMICAL EQUIPMENT

The Gulf Coast of Texas and Louisiana is a big and rapidly growing market. Our organization is staffed by engineers who know the market and the technical problems of the petroleum, petro-chemical and industrial activities of this area. Have own warehouse facilities. We invite correspondence with chemical and equipment manufacturers interested in effective sales representation. Address:

DIXIE CHEMICAL COMPANY
718 North Drennan, P.O. Box 6522
Houston, Texas

Notice—Date Extended

for Bids on Oil & Gas Leases

. . . on approximately 7,784 acres land in Perry County, near Richton, Mississippi; offered by U. S. Government, Farm Security Administration; and advertised in April 22, 1946 OIL WEEKLY.

Sealed bids for leasing this property will be received in the office of F. E. Bates, Regional Business Manager, F.S.A., 319 Donaghey Trust Building, Little Rock, Arkansas, until 2:00 P.M., C.S.T. MAY 28, 1946.

(Note: **This is an extension of 2 weeks time.)**

WANTED

Well-shooter's Reel and measuring device. Also need ¼ inch or smaller armored conductor cable.

WELL EXPLOSIVES, INC.
P. O. Box 938, Southside Station
Fort Worth, Texas—Phone 9-2097

HOUSTON LABORATORIES

Analytical and Consulting Chemist
Podbielniak Gas Analysis

Oil Field Brines, Waters and Cores
Complete Evaluation of Crude Oils

Long Distance 267. Box 132, Houston, Tex.

Mailing Lists—Personnel of Producers, Refiners, Natural Gasoline-Cycling Plants, Oil and Gas Pipe Lines, Drilling Contractors, Supply Stores, Machine Shops. Write for catalogue. Oil Industry Mailing List Company, Tom Robinson, Manager, 319 Castle Building, Tulsa 3, Oklahoma.

THE FORT WORTH LABORATORIES

Analysis of oil field brines, cores, gas, oil and minerals. Field gas testing. R. H. Fash, Vice President; Long Distance 138 822½ Monroe Street, Fort Worth, Texas

William M. Barret, Inc.
Consulting Geophysicists

Specializing in Magnetic Surveys

Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.

GIDDENS-LANE BUILDING
SHREVEPORT, LOUISIANA

Shell Employes Complete Series Of Mid-Continent Meetings

Shell Oil Company has completed a series of company-sponsored employe "get - togethers" throughout the Mid-Continent area. Almost 4000 employes and their families participated in these annual meetings in Mid-Continent operations located in North Texas, Texas Panhandle, Oklahoma, Kansas and Illinois. Shell "get-togethers" are held in honor of employes reaching their 10, 15, 20, 25, etc., years of service, and at the meetings service emblems representing anniversary attainments were presented.

R. B. Roark

This year's meetings were highlighted at a dinner in Tulsa when R. B. Roark, vice president of Shell in Tulsa, paid special tribute to veterans who have returned to Mid-Continent operations.

With a "well done" expression of thanks Roark recalled that few veterans had attended last year's meetings. "I wish to commend those who served as well as those who are still in uniform for the grand and unselfish job they have done and are now doing all over the world to help preserve the American way of life."

Throughout the Mid-Continent operations, 112 emblems were presented representing a total of 1715 years of Shell service.

Standard of California Plans Construction of Laboratory

Standard Oil Company of California will start construction in June on a production technology laboratory.

The new laboratories, which will include five laboratory units and a group of offices, are to be built adjacent to the Murphy-Coyote field situated about four miles northwest of Fullerton. The new building will replace temporary structures in which research and administrative work now is being done.

The laboratories will be used primarily for study of drilling operation methods and problems related to recovery of crude oil in established fields.

THE OIL MAN'S CALENDAR

MAY	
23–25	**National Oil Scouts and Landmen's Association, Annual Convention, Jackson, Mississippi, Hotel Heidelberg.**
28–29	**American Petroleum Institute, Directors' Meeting, Fort Worth, Blackstone Hotel.**
JUNE	
6– 7	**Mid-Continent District, Production Division, API, Spring Meeting, Oklahoma City, Skirvin Hotel.**
7– 8	**Kentucky Oil and Gas Association, Lexington, Ky., Hotel Lafayette.**
13–14	**Eastern District, Production Division API, Spring Meeting, Pittsburgh, Pa., William Penn Hotel.**
17	**FPC Gas Hearing, Washington, D.C. Court of Appeals, 5th and E.**
27–28	**Pennsylvania Grade Crude Oil Association, Annual Meeting, Pittsburgh, William Penn Hotel.**
AUG.	
8–9–10	**Interstate Oil Compact Commission, Quarterly Meeting, Grand Rapids, Michigan, Pantlind Hotel.**
OCT.	
1–2	**American Association of Oilwell Drilling Contractors, Annual Meeting, San Antonio, Plaza Hotel.**
7–12	**American Gas Association, Annual Convention, Atlantic City, N.J.**
16–18	**Texas Mid-Continent Oil and Gas Association, Houston, Rice Hotel.**
28–30	**Independent Petroleum Association of America, Annual Meeting, Fort Worth.**
NOV.	
11–14	**American Petroleum Institute, Annual Meeting, Chicago, Stevens Hotel.**

Advertisers' Index

EDITORIAL INDEX, PAGE 19

* Indicates detailed information on products and services included in 1943-44 edition of Composite Catalog of Oil Field and Pipe-Line Equipment.

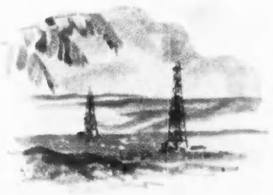
Aireon Manufacturing Corp. 88
Anchor Weld Repair Service 90
*Baker Oil Tools, Inc. 18 and 59
Wm. M. Barret, Inc. 96
Beaumont Well Works Co. 90
*Bethlehem Supply Co. 69
*The Buckeye Traction Ditcher Co. 56
*Cameron Iron Works, Inc. 40
Dan L. Clark Drilling Co. 68
Climax Molybdenum Co. 64
Crane Co. 33
W. H. Curtin & Co. 95
Dixie Chemical Co. 96
*Durbin-Durco 62
*Emsco Derrick & Equipment Co. 63
*Fairbanks, Morse & Co. 51
Farm Security Administration 96
Ft. Worth Laboratories 96
*Gaso Pump & Burner Manufacturing Co. 1
Gemco Oil Tools, Inc. 12
*General Electric Co. 11
The Geolograph Co. 84
*Gray Tool Co. 39
Grove Regulator Co. 13
*The Guiberson Corp. 17
Gulf Engineering Co. 90
The Halbert Co. 57
Houston Laboratories 96
Houston Radio Supply Co. 94
*Hughes Tool Co. IV Cover
*International Harvester Co. 9
The International Nickel Co. 8
*Jensen Brothers Manufacturing Co. 93
*The S. M. Jones Co. 71
*Jones & Laughlin Steel Corp. 20
Jones & Laughlin Supply Co. 77
*Lane-Wells Company 52
*Larkin Packer Co. 22
*Link-Belt Co. 79
A. M. Lockett & Co. 72
Lone Star Cement Corp. II Cover
*Magnet Cove Barium Corp. III Cover
*McCullough Tool Co. 15
*McKissick Products Corp. 6
The Metal Ware Corp. 94
Mid-Continent Tool and Supply Co. 88
*Mission Manufacturing Co. 75
Mudrite Chemicals 94
*The National Supply Co. 48-49
Norton Equipment Co. 91
Oil Industry Mailing List Co. 96
Paint-Point Products Co. 72
*Patterson-Ballagh 43 and 91
*Pelican Well Tool & Supply Co. 82
*Penberthy Injector Co. 58
Power Application & Mfg. Co. 59
*Rector Well Equipment Co. 62
*Reed Roller Bit Co. I Cover
Republic Steel Corp. 7
The Second National Bank of Houston 10
*Shaffer Tool Works 81
Shell Development Co. 16
Sinclair Refining Co. 4
Smith Contracting Co. 57
Southern Engine & Pump Co. 84
*Spang & Co. 87
*Standco Brake Lining Co. 2
S. G. Taylor Chain Co. 62
*Templeton, Kenly & Co. 59
*Thornhill-Craver Co. 83
Trading Post Section 89
*Tretolite Co. 3
*The Union Chain & Manufacturing Co. 72
*Union Wire Rope Corp. 60-61
The University of Texas 86
Well Explosives, Inc. 96
*The Wheland Co. 14
*Wickwire Spencer Steel Co. 85
*Wilson Manufacturing Co. 5
The Youngstown Sheet & Tube Co. 24

LIBRARY

The OIL WEEKLY

1946 WORLD OIL ATLAS

SKYLINE of a new world



The world-renowned reputation symbolized by the Hughes trademark is a tribute to the superior performance of Hughes Rock Bits, Core Bits, Tool Joints, and other specialized oil well drilling tools. In every field, the world over, the decisive preference given Hughes Tools offers a true yardstick for measuring the value of Hughes Dependability . . . dependability born of progressive manufacture to the exacting standards that have made Hughes Tools . . . *Standard of the Industry*

Hughes
TOOL COMPANY

Section 2, Issue of May 20, 1946 Price $1.00

When your wells go on the pump you've got to specify quality equipment to bring the crude *up* and keep production costs *down.*

That's where the Axelson pumping partners enter the picture – Axelson Deep Well Plunger Pumps, engineered and designed to give long lifting life despite any adverse well condition–and Axelson Sucker Rods representing the ultimate in wear and shock resistance in keeping the heaviest fluid column moving with minimum down-time.

These pumping partners have been delivering complete customer satisfaction – through every type of formation found in the world's oil fields – for half a century. The reputation established in that time is your guarantee of trouble-free pumping – at a profit.

AXELSON DEEP WELL PLUNGER PUMPS AND SUCKER RODS

AXELSON MANUFACTURING COMPANY

PLANTS–6160 So. Boyle Avenue (P. O. Box 98, Vernon Station), Los Angeles 11, Calif. • 3844 Walsh Street, St. Louis 16, Missouri. OFFICES–50 Church Street, New York City 7 • National Bank of Tulsa Building, Tulsa 1, Okla. • Avda Pte. R. Saenz Pena 832, Buenos Aires, Argentina DISTRIBUTORS–Jones & Laughlin Supply Company • Great Northern Tool and Supply Company • C. C. McDermond, Apartado 331, Maracaibo, Venezuela • Industrial Agencies, Ltd., San Fernando, Trinidad, B.W.I.

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

CONSULT YOUR CLASSIFIED DIRECTORY FOR THE NEAREST AXELSON DEALER IN YOUR VICINITY, OR WRITE, WIRE OR TELEPHONE THE NEAREST AXELSON PLANT AT LOS ANGELES OR ST. LOUIS.

This 4-color advertisement is designed and prepared by The McCarty Company, Los Angeles, California

CONTENTS

COUNTRIES	MAP PAGES	DATA PAGES
GENERAL		
Foreword		7
World Airlines	10, 11	
World Oil Flow	14, 15	
Table of Measurements, U. S. and Equivalents		17
Petroleum Reserves of U. S. and Other Nationals		19, 21
World Oil Possibilities	22, 23	
World Production		27, 29, 31
World Production Tables		33, 35, 37
Advertisers' Index		319
NORTH AMERICA		
Alaska	39	41
Canada, Western	43	45
Canada, Alberta	47	49
Canada, Eastern	51	53
Central America	87	89
Cuba, The Bahamas	95	93
Dominican Republic, Haiti	95	97
Mexico	75	77, 81, 85
Mexico, Tampico Area	79	
Mexico, Isthmus Area	83	
United States Production	55	
U. S. Crude Oil Production by Years		56, 57
U. S. Petroleum Reserves and Discovery Record		59
Producing Oil Wells		59
Refinery Production, Major Products		63
Oil and Gas Pipe-Line Mileage		65
Completions 1944 and 1945		67
Productive Wildcats, 1945 and Before		70
Unproductive and Total Wildcats		71
Footage and Average Depth of Wells, 1945		73
SOUTH AMERICA		
Argentina	99	101, 105, 109
Argentina, Salta Area	103	
Argentina, Mendoza Area	107	
Argentina, Comodoro Rivadavia and Plaza Huincul	111	
Bolivia	115	117
Brazil	119	121
Chile	123	125
Colombia	127	129, 133
Colombia Oil Concessions	131	
Ecuador	135	137, 141
Ecuador, Sta. Elena Peninsula	139	
Paraguay	151	153
Peru	143	145, 149
Peru, Northwest Coast Oil Area	147	
Trinidad	167	169
Venezuela	155	157
Venezuela, Western Area	159	161
Venezuela, Eastern Area	163	169
EUROPE		
Albania	203	205
Austria	187	189
Bulgaria		317
Czechoslovakia	195	195
Denmark		317
England	171	173
Estonia		317
France	175	177
Germany, Netherlands	179	181, 185
Germany, North Basin	183	
Greece	203	205
Hungary	191	193
Italy	199	201
Netherlands, Germany	179	181, 185
Poland	207	209
Roumania	211	213
Spain		317
Sweden		317
Turkey		317
Yugoslavia	203	205
UNION OF SOVIET SOCIALIST REPUBLICS		
Russia		217, 221, 225, 233, 241
European Area	215	
Baku (Azerbaijan) Area	219	
Grozny, South Georgian Areas	223	
Crimea, Kuban-Maikop Areas	227	
Ural-Volga, Kama River Areas	231	
Emba Basin Area	235	
Turkmen, Uzbek-Tadzik-Kirgiz Areas	239	
Daghestan Area, Sakhalin Island	241	
Eastern Siberia	243	
ASIA		
Middle East		245
Bahrein	263, 267	265, 269
Iran	255	257
Iraq, Oil Area	251	249
Kuwait	259	261
Middle East, Northwest Area	247	
Qatar	263, 267	265, 269
Saudi Arabia	263, 267	265, 269
Afghanistan		317
Burma	275	277
China	279	281
India	271	273
Japan	283	285
OCEANIA		
Australia	303	305
Borneo	295	
Ceram	299	
East Indies	287	289, 293
Java	299	
New Guinea	299	
New Zealand	307	305
Philippine Islands		317
Sumatra	291	
AFRICA		
Algeria	315	312
Egypt	309	311
Ethiopia		317
Morocco	315	312
Portuguese East Africa		317
Tunesia	315	312
South Africa		317

Applied or replaced by hand-ANYWHERE

REED SUPER SHRINK-GRIP TOOL JOINTS

For *MORE WELLS PER STRING*

You get GREATER PROTECTION AGAINST LEAKAGE AND FAILURE because of these TWO SEALS

1. THE SHRINK-GRIP "SAFETY AREA" which is an extended tool joint counterbore shrunk onto a machined external upset on the drill pipe.

11. THE GAUGING SHOULDER upon which the end of the drill pipe lands, assuring proper make-up and affording an **added seal** against leakage.

You get GREATER ECONOMY because

the Reed Super Shrink-Grip Tool Joint CAN BE APPLIED BY **HAND** . . . . ANYWHERE saving long hauls, high application costs, and shut down time.

All Reed tool joint threads are carefully hobbed in accurate axial alignment, assuring complete interchangeability and a drill string free from unnatural stresses and strains.

Protect your drilling string investment. Specify Reed Super Shrink-Grip Tool Joints.

P. O. BOX 2119 · HOUSTON 1, TEXAS

REED

THE OIL WEEKLY

ENGINEERING • NEWS • STATISTICS

Published by THE GULF PUBLISHING COMPANY, Houston, Texas

R. L. DUDLEY, *President, Publisher* A. L. BURNS, *General Manager*

TOM W. NELSON, *Advertising Manager*

Specialized Oil Publications of
THE GULF PUBLISHING COMPANY

The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipeline industry

PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

DAILY OIL NEWS, published only during annual American Petroleum Institute meetings.

WORLD OIL ATLAS, an annual section of a regular issue of *The Oil Weekly*

ADVERTISING STAFF

DICK SWINSKY, ROBERT N. CAIRD, JR., NELSON BIGELOW ..... New York
ROBERT B. FARSON ..... Cleveland
H. G. FITZPATRICK ..... Chicago
J. F. CARTER, JR. ..... Tulsa
J. W. CURTS ..... Los Angeles
CHARLES WYATT, BILL ATCHESON ..... Houston

BRANCH OFFICES

NEW YORK ..... 250 Park Ave. (17)
CLEVELAND ..... 1010 Euclid Ave. (15)
CHICAGO ..... 332 S. Michigan Ave. (4)
LOS ANGELES ..... W. W. Wilson Bldg. Huntington Park, Calif.
TULSA ..... Hunt Bldg. (3)
FORT WORTH ..... W. T. Waggoner Bldg. (2)
WASHINGTON ..... Albee Bldg. (5)

CIRCULATION DEPARTMENT

J. HOWARD DONAHUE ..... Manager

ABC

Member Audit Bureau of Circulation and Associated Business Papers, Inc.

ABP

EDITORIAL STAFF

WARREN L. BAKER, *Editor*
SILAS B. RAGSDALE, *Managing Editor*
L. J. LOGAN, *Associate Editor*

DISTRICT EDITORS

BERTRAM F. LINZ ..... Washington
H. H. KING ..... Fort Worth
GEORGE O. IVES, HENRY OZANNE ..... New York
ANTHONY GIBBON, JAMES S. CRITZ ..... Tulsa
R. W. BYRAM ..... Austin
GILBERT M. WILSON ..... Los Angeles
WELDON B. HILL, GORDON B. NICHOLSON, AL REESE, J. E. KASTROP, C. CLYDE PRYOR ..... Houston

Foreword . . .

There long has been a need for a WORLD OIL ATLAS concentrating within its covers authoritative maps and statistical data dealing with the oil industry's world-wide activities.

More than 15 months ago the decision was reached to undertake publication of the volume you are now reading.

Obviously the difficulties of publishing a comprehensive volume of this nature are great, and the undertaking one of considerable expense. To begin with, assembly of the statistical material in a uniform style presents a genuine problem, because it frequently occurs that the governmental forms used in the different countries vary. Too, much of the information has to be gathered from an infinite number of sources, checked as carefully as possible, and then fitted as far as permissible into a standard form.

Editors of THE OIL WEEKLY approached the compilation of this WORLD OIL ATLAS fully aware that without the assistance of governmental agencies in the many countries covered and without the assistance of the oil companies operating on a world-wide scale, the task was a hopeless one. Fortunately we have had the assistance needed, with few exceptions, and we acknowledge with deep appreciation such assistance, which came from literally hundreds of sources.

Included in this Atlas will be found not only maps covering all of the countries, colonies, and affiliates of the world having commercial oil production, but many which have not as yet passed the exploratory stage. Included, too, is certain information not necessarily of a statistical nature, when such information was available and deemed important by the editors.

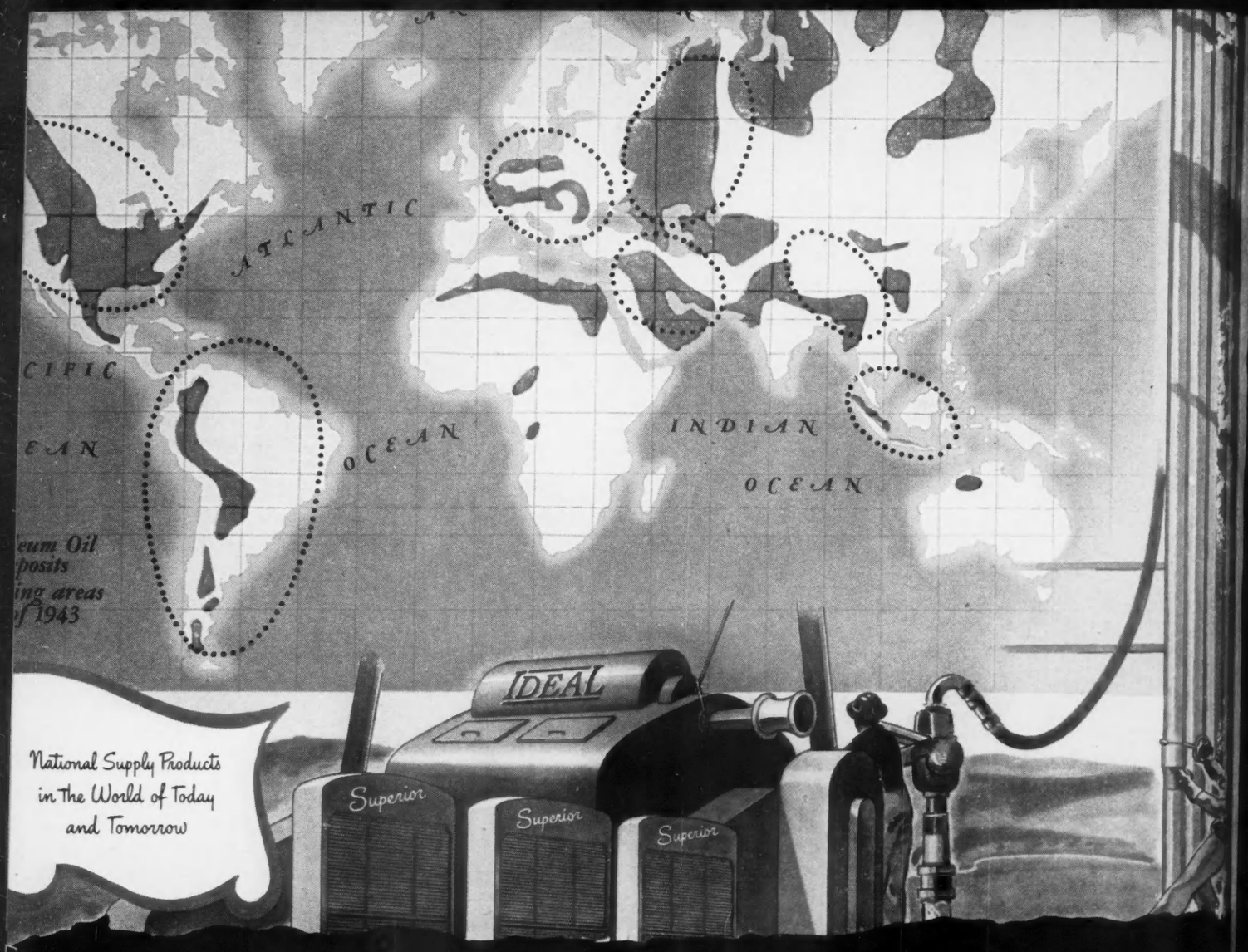
For instance, it would, of course, be desirable to locate all non-producing wildcats drilled to date in each country. But in most instances, even if the data were available, it would be impossible to spot it all on maps of the scale necessarily used. On the other hand it has been found practical to locate such information in the case of some countries.

The publication date (May 20) has been chosen because it requires considerable time to develop the statistical data covering the past calendar year, and it was felt that, insofar as was possible, the statistical data should reflect activity by calendar years.

In almost every instance the arrangement of maps and data has followed recognized geographical boundaries. One exception is Russia which embraces large parts of two continents and constitutes an oil empire within itself.

In conclusion, it is our thought that the world-wide activities of the oil industry will annually increase in importance and that this, the WORLD OIL ATLAS, which will be published each year as a section of THE OIL WEEKLY, will become more valuable with each successive year of publication.

THE EDITORS.



Much of the World's hidden Oil Wealth

WILL BE DRILLED AND PUMPED BY NA

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO • DIVISION OFFICES: DENVER • FT. WORTH • PITTSBURGH • TULSA •

EXPORT: NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N. Y., U. S. A.; RIVER PLATE HOUSE, 12 SOUTH PLACE,

Individually, the trade names Ideal—National—Spang—Superior have earned in their own right an enviable reputation for faithful service.

Collectively, as "National Blue Products" they justly merit the designation "First in Quality."

IDEAL . . . A pioneer name in rotary drilling. Ideal Rotary Machines, Draw Works, Slush Pumps, Swivels, Traveling Blocks and many other items of equipment established a leadership with the introduction of the rotary system of drilling that has never been excelled.

NATIONAL . . . Recognized since the early days of the industry as the "Complete Equipment Service." For over fifty years equipment bearing this famous name has accompanied the wildcatter and the producer to the oil fields of the world.

SPANG . . . Oil Country Tubular Products manufactured with the pride of craftsmanship resulting from 106 years of experience in meeting the exacting needs of the industry. Spang Shrink Thread Drill Pipe and Tool Joints combine economy and efficiency to the highest degree.

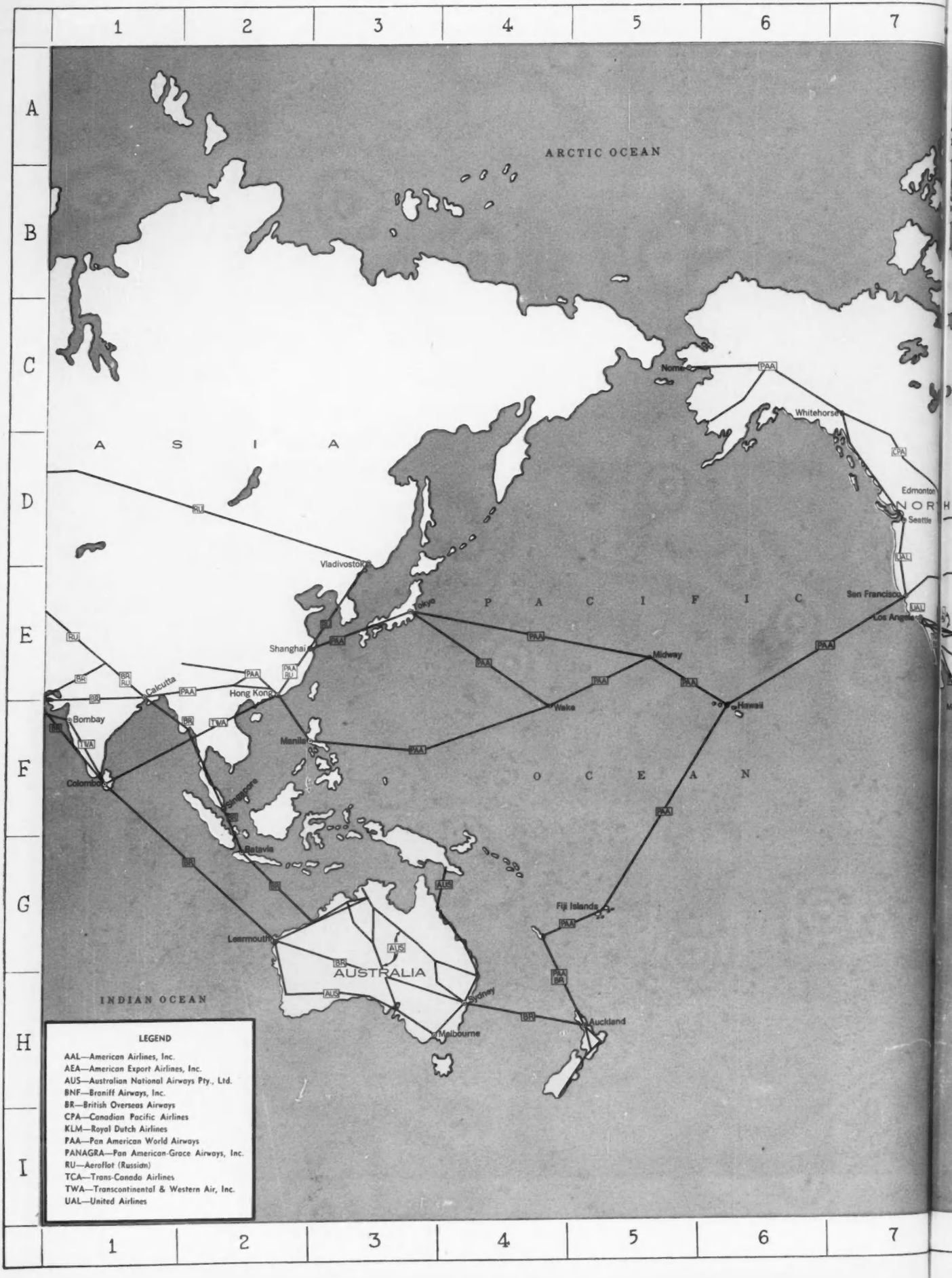
Y NATIONAL MACHINERY AND EQUIPMENT

SUPERIOR . . . From the crude gas engine of the '80's to the modern diesel, Superior has always stood for economy and dependable power.

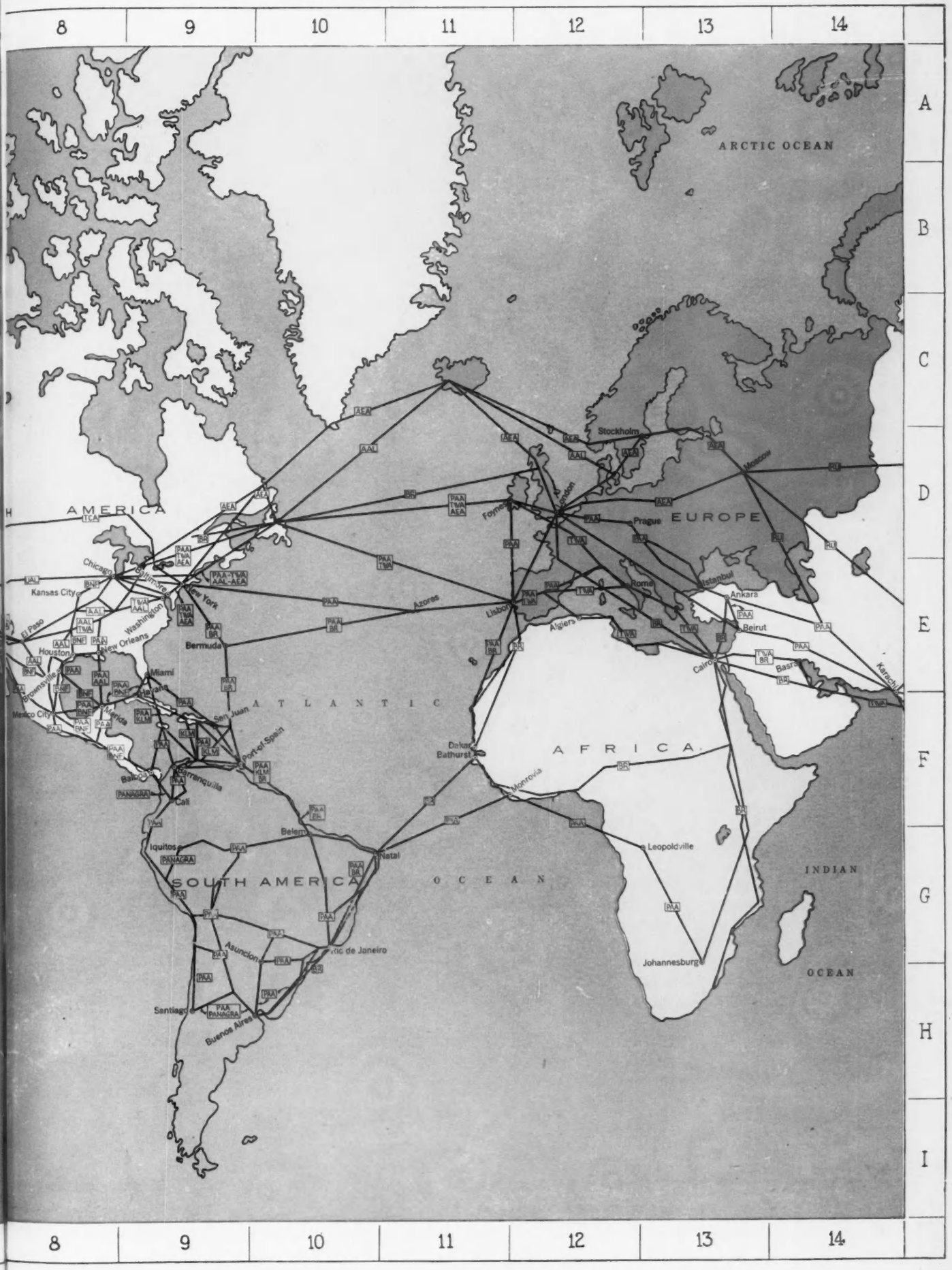
TORRANCE
LONDON, E.C.2.

First in Quality — THE NATIONAL SUPPLY COMPANY — NATIONAL BLUE PRODUCTS

PRINCIPAL AIR



LINES OF WORLD



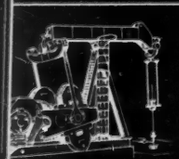
LUFKIN

No field too deep!

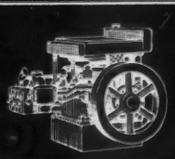
No field too shallow!

There is a Lufkin Unit for every depth and condition

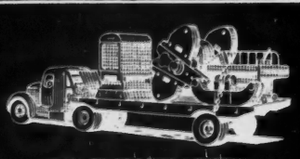
Conventional Lufkin Unit with Lufkin Cooper-Bessemer horizontal gas engine drive — a completely Lufkin engineered installation



LUFKIN
PUMPING UNITS



LUFKIN-COOPER BESSEMER
ENGINES



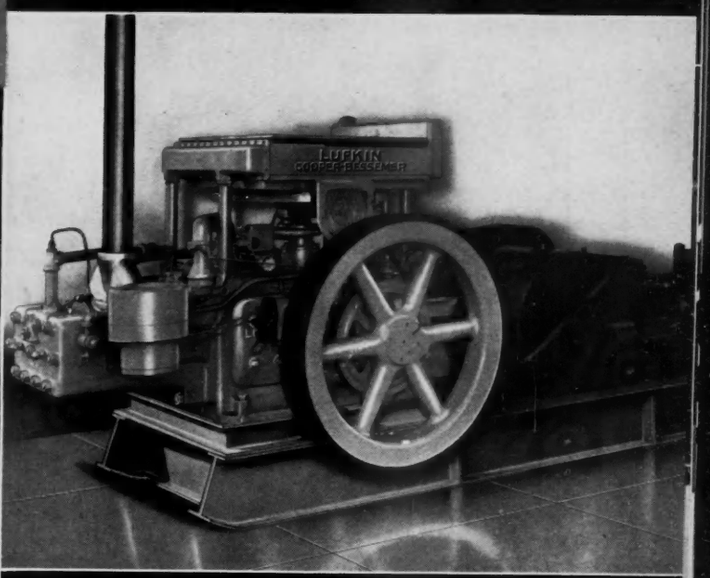
LUFKIN OIL FIELD AND INDUSTRIAL
TRUCK TRAILERS

INDUSTRIAL SPEED REDUCERS
AND INCREASERS

LUFKIN FOUNDRY AND

HAS EARNED WORLD-WIDE RECOGNITION FOR RUGGED DEPENDABILITY AND EFFICIENCY

Lufkin Cooper-Bessemer Horizontal Gas Engine—
40-60 H.P. two cylinder two cycle 400-600 R.P.M



Lufkin Cooper-Bessemer Engine and Pump assem

Lufkin extra heavy duty tractor winch 125,000 p
line pull, worm drive for International TD 18 and T
Tractractors

WORLD-WIDE Recognition means Lufkin Pumping Units in every oil field of the world!

Foreign operators, no less than the domestic producers, need rugged, trouble-free equipment—equipment requiring few repairs and adjustments—equipment which will give long lasting, year in—year out service.

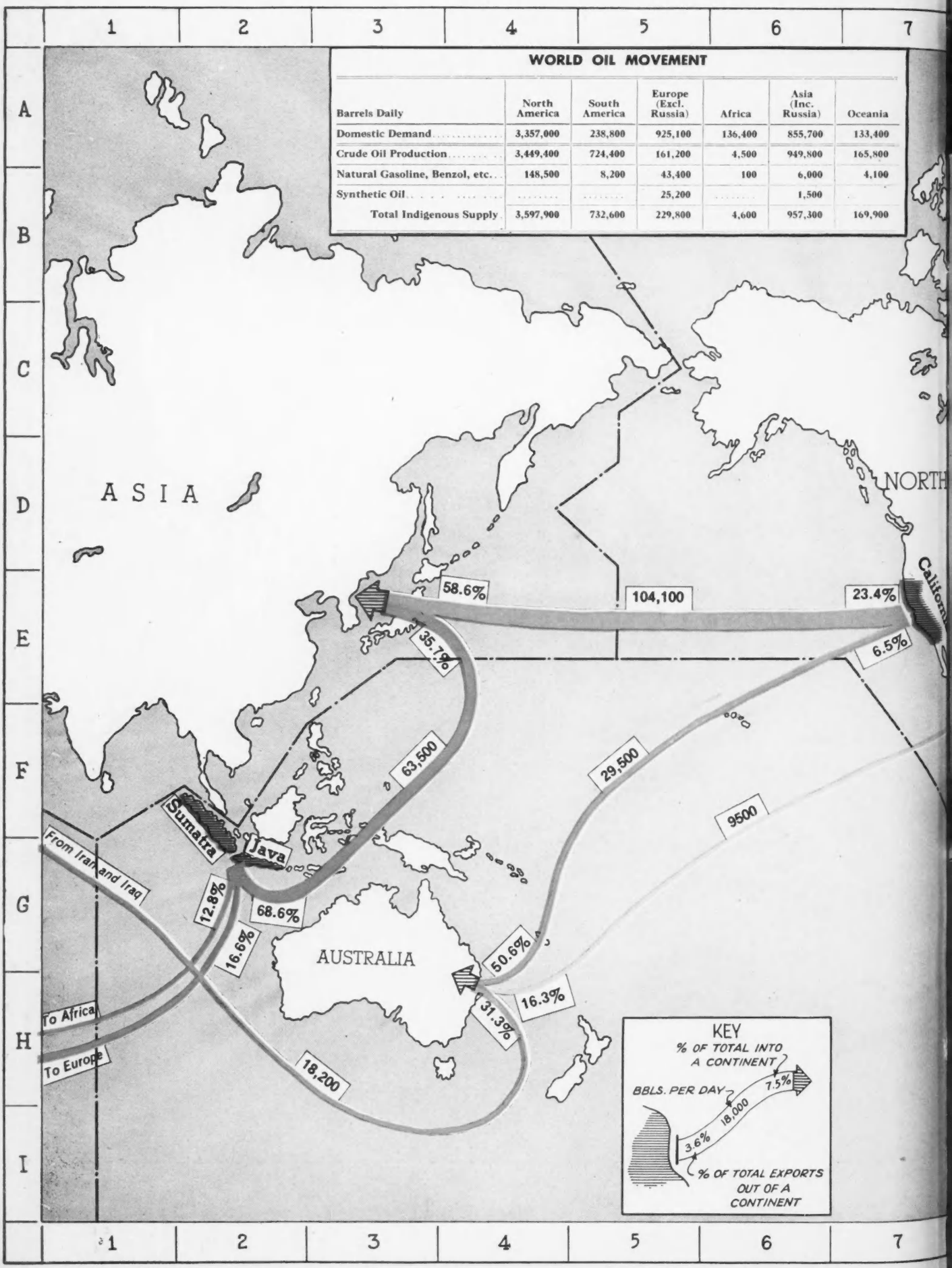
Lufkin pioneered and developed the application of reduction gears to oil well pumping.

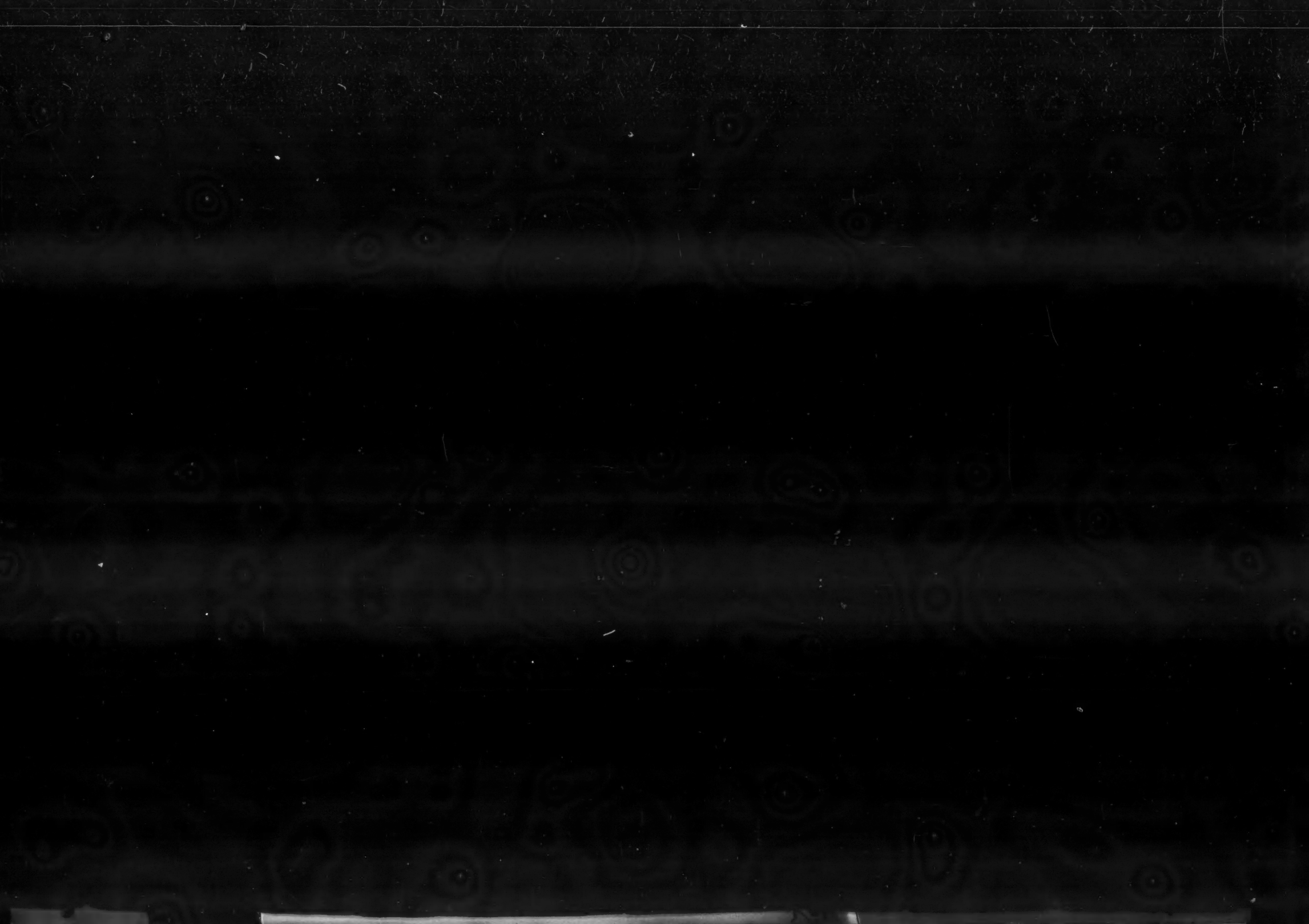
DIVISION LUFKIN FOUNDRY & MACHINE COMPANY
INDUSTRIAL, MILL AND AUTOMOTIVE SUPPLIES

MACHINE CO. LUFKIN, TEXAS · U·S·A·

OIL MOVEMENT

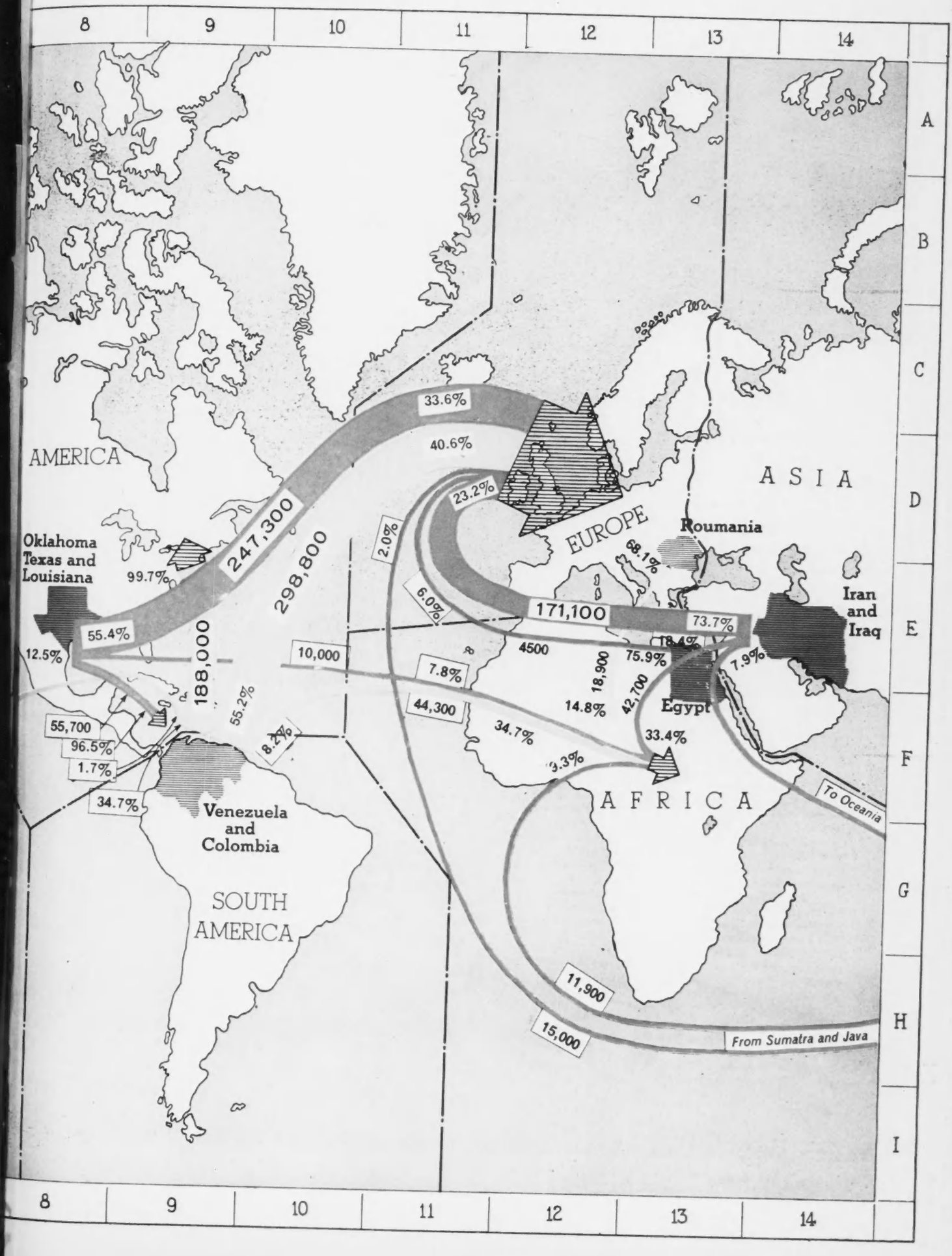
Courtesy Standard Oil Company (New Jersey)





OF THE WORLD

Based on Prewar Figures



PRECISION DRILLING*

* Calls for Accurate Instruments... Conveniently Placed

Martin-Decker's 20 years' leadership in developing and manufacturing the finest and most sensitive drilling control devices has resulted in "SEALTITE" construction—the ultimate in modern, efficient oilfield instrumentation. Sealtite instruments are not only rugged and dependable, but they are mounted in such a way as to give the operator maximum assistance—not strewn all over the rig so that the driller must rush from one gauge to another in an effort to watch them all.

For this reason the Martin-Decker Sealtite—the master drilling control instrument that combines weight indicator, mud pump gauge, torque gauge, tachometer and recorder in one compact steel unit—is mounted at the drawworks directly in front of the driller's position, making it simple and easy to keep an accurate check on drilling operation without leaving the controls. And because it is installed on the drawworks, it is protected from the damaging vibration and whip occasioned by deadline mounting.

Installation of the Sealtite is fast and foolproof—no pumping up, priming or adjusting is ever necessary. The fluid system is factory loaded and calibrated and remains permanently sealed even during transportation and storage, eliminating all possibility of leaks. The special non-corrosive, non-freezing fluid insures the highest possible accuracy under even the most severe cilmatic conditions.

Also available in Sealtite construction is the CLIPPER SEALTITE WEIGHT INDICATOR, the portable instrument designed especially for use with jackknife, portable or mast rigs or for conventional derricks having restricted floor space. It combines all the advantages of Sealtite construction with extreme accuracy, maximum portability and minimum rig-up time for quick jobs.

Twenty years of study and development have made Martin-Decker drilling and production instruments the leaders in the control field. And our pledge of continued research and advancement in the weight control and measurement field is your assurance that we shall continue to furnish the industry with the finest of reliable, sensitive instruments—equipment that is years ahead in performance, dependability and accuracy.

HOME OF THE WEIGHT INDICATOR

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: T. J. CULLEN, BAKERSFIELD, CALIFORNIA
MID-CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS

CONVERSION FACTORS
MONEY VALUES

Convenient Tables for Converting United States Terms into Foreign Equivalents

UNITS OF LENGTH

U.S. Terms to Foreign	Foreign Terms to U.S.
1 inch = 2.540 centimeters	1 centimeter = 0.3937 inch
1 foot = .3048 meter	1 meter = 3.2808 feet
1 yard = .9144 meter	1 meter = 1.0936 yards
1 statute mile = 1.609 kilometers	1 kilometer = 0.6214 statute mile
1 statute mile = .8684 nautical mile	1 nautical mile = 1.152 statute miles

UNITS OF AREA

U.S. Terms to Foreign	Foreign Terms to U.S.
1 square inch = 6.4516 square centimeters	1 square centimeter = 0.1550 sq. inch
1 square foot = 0.0929 square meter	1 square meter = 10.764 square feet
1 square yard = 0.8361 square meter	1 square meter = 1.196 square yard
1 sq. (statute) mile = 2.5900 sq kilometers	1 square kilometer = 0.3861 sq. mile
1 acre = .00407 square kilometers	1 square kilometer = 247.104 acres
1 acre = 0.4047 hectares	1 hectare = 2.471 acres
1 acre (U. S.) = 1 acre (British)	1 acre (British) = 1 acre (U.S.)

UNITS OF VOLUME

U.S. Terms to Foreign	Foreign Terms to U.S.
1 cubic inch = 16.387 cubic centimeters	1 cubic centimeter = .0610 cubic inch
1 cubic foot = .0283 cubic meter	1 cubic meter = 35.314 cubic feet
1 cubic yard = .7646 cubic meter	1 cubic meter = 1.308 cubic yards
1 gallon (American) = 3.785 liters	1 liter = 0.2642 gallon (American)
1 barrel (oil) = 158.98 liters	1 liter = .00629 barrels (oil)
1 U. S. gallon = .8327 Imperial gallon	1 Imperial gallon = 1.201 U. S. gallons
1 barrel (oil) = .15897 cubic meter	1 cubic meter (1000 liters = 6.2897 barrels (oil)

UNITS OF MASS

U.S. Terms to Foreign	Foreign Terms to U.S.
1 gram = .0353 ounces	1 ounce = 28.35 grams
1 kilogram = 2.205 pounds	1 pound = .4536 kilogram
1 short ton = .9072 metric ton	1 metric ton = 1.102 short tons
1 long ton = 1.016 metric tons	1 metric ton = .9842 long tons

UNITS OF MASS AND VOLUME

U.S. Terms to Foreign	Foreign Terms to U.S.
1 barrel = .1515 short ton 32° oil	1 short ton 32° oil = 6.600 barrels
1 barrel = .1479 short ton 36° oil	1 short ton 36° oil = 6.761 barrels
1 barrel = .1445 short ton 40° oil	1 short ton 40° oil = 6.922 barrels
1 barrel = .1389 long ton 32° oil	1 long ton 32° oil = 7.157 barrels
1 barrel = .1363 long ton 36° oil	1 long ton 36° oil = 7.336 barrels
1 barrel = .1332 long ton 40° oil	1 long ton 40° oil = 7.508 barrels
1 barrel = .1375 metric ton 32° oil	1 metric ton 32° oil = 7.273 barrels
1 barrel = .1342 metric ton 36° oil	1 metric ton 36° oil = 7.453 barrels
1 barrel = .1311 metric ton 40° oil	1 metric ton 40° oil = 7.628 barrels

Crude Conversion

The U. S. Bureau of Mines uses the factors shown below to convert crude petroleum from metric tons to barrels of 42 gallons each (based on latest data available for each country).

Country	Bbls. per Metric Ton
Albania	6.672
Argentina	7.022
Austria	6.776
Bahrein Islands	7.328
Bolivia	7.716
British Borneo:	
Brunei	7.229
Sarawak	6.654
Canada	7.766
Colombia	7.031
Czechoslovakia	6.770
Ecuador	7.585
Egypt	7.003
France	7.129
Germany	6.993
Hungary	7.536
India	7.240
Iran	7.566
Iraq	7.481
Italy	7.652
Japan	7.030
Mexico	7.166
Netherlands East Indies	7.785
Peru	7.539
Poland	7.419
Rumania	7.430
Saudi Arabia	7.417
Trinidad	7.080
U. S. S. R.:	7.266
Sakhalin	6.820
United States	7.401
Venezuela	6.842

Products Factors

For petroleum refined products the factors shown below are used by the U. S. Bureau of Mines to convert to barrels of 42 gallons each.

Type of Product	Bbls. per Metric Ton
Aviation Gasoline	9.00
Motor Gasoline	8.50
Kerosine	7.75
Gasoil, Diesel Oil	7.25
Distillate Oil	7.25
Residual Fuel Oil	6.66
Lubricating Oils	7.00
Benzol	7.14
Mineral Spirits	8.40
Paraffin Wax	7.87
Petrolatum	7.87
Grease	6.30
Asphalt and Road Oil	6.06
Petroleum Coke	5.50

General

$$\text{Specific Gravity} = \frac{141.5}{131.5+\text{API}}$$

$$\text{API}+131.5 = \frac{141.5}{\text{Specific Gravity}}$$

$$\text{API} = \left(\frac{141.5}{\text{Specific Gravity}}\right) - 131.5$$

Other Conversion Factors

Multiply	By	And Obtain
Acres (U.S.)	4046.873	Square Meters
Acres (U.S.)	5645.4	Square Varas.
Barrel, Water 60° F. (42 gallon)	.1588	Metric Ton
B.t.u.	252.0	Calories
Calorie	3.966832	B.t.u.'s
Centiliter (Cubic Centimeter)	.61024	Cubic Inches
Centigrade	1.8 (+32)	Fahrenheit
Centimeter	.032	Feet
Centimeter	.010	Yard
Centimeter, Mercury	.1934	Pounds/Square Inch
Cubic Feet	28.317	Liters
Cubic Inches	.01639	Cubic Decimeter
Cubic Meter	35.318	Cubic Feet
Cubic Meter	1.308	Cubic Yard
Cubic Meter	264.2	Gallon
Deciliter	6.1023	Cubic Inches
Decimeter	3.9370113	Inches
Dekaliter	2.2	Gallons
Dekaliter	610.16	Cubic Inches
Dekameter	393.70113	Inches
Fahrenheit 1°	.5556	Centigrade
Feet U.S.	.3600	Vara
Feet U.S.	.0003048	Kilometer
Gallon, Liquid, U.S.	3.785	Cubic Decimeters
Gallon, Liquid, U.S.	.003785	Cubic Meter
Hectare	.003861	Square Mile
Kiloliter (1000 liters)	264.14	Gallon, U.S.
Kiloliter (1000 liters)	35.31	Cubic Feet
Kilometer	3280.83	Feet
Kilogram	.0011023	Ton (Short)
Liter	61.02	Cubic Inches
Liter	2.202	Pounds, Water 62° F.
Meter	3.280843	Feet
Mile, Statute	1900.8	Varas
Millimeter	.03937	Inches
Ounce, Fluid, U.S.	29.5729	Milliliters
Stere	1	Cubic Meter
Stere	35.3105	Cubic Feet
Stere	1.308	Cubic Yard
Ton, Metric	2204.6	Pounds
Ton, Metric	6.297	Barrels Water 60° F. (31.5 gallons)

Foreign Exchange Rates

COUNTRY	Unit Quoted	Type of Exchange	LATEST AVAILABLE QUOTATION Rate	Approximate Equivalent in U.S. Currency	Date
Venezuela	Bolivar	Controlled	3.35*	$.2985	Jan. 24, 1946
		Free	3.35*	.2985	Jan. 24, 1946
Mexico	Peso	Free	4.86*	.2058	Jan. 31, 1946
Colombia	Peso	Com'cial Bank	1.746*	.5727	Dec. 31, 1945
		Bank of Republic	1.755	.5698	Dec. 31, 1945
		Curb	1.83	.5464	Dec. 31, 1945
Peru	Sol	Free	6.50*	.1538	Nov. 30, 1945
Argentina	Paper Peso	Official A	3.73*	.2681	Feb. 20, 1946
		Official B	4.23	.2364	Feb. 20, 1946
		Bid	4.94	.2024	Feb. 20, 1946
		Free Market	4.11	.2433	Feb. 20, 1946
Curacao	Guilder	Official	1.905*	.5249	April 1, 1946
Aruba	Guilder	Official	1.905*	.5249	April 1, 1946
Trinidad	W.I. Dollar	Official	1.197⅛*	.8342	April 1, 1946
Ecuador	Sucre	Official	14.04*	.0712	Feb. 28, 1946
Bolivia	Boliviano	Official	42.42*	.0236	Jan. 31, 1946
		Curb	64.50	.0155	Jan. 31, 1946
Iraq	Dinar	Official[1]	.24	4.035	1945
Egypt	Egyptian	Official[1]	.24	4.15	1945
Saudi Arabia	Riyal	Official[1]	3.33	.30	Jan. 22, 1946
Bahrein Islands	Indian Rupee	Official[1]	3.32[2]	.30	April 22, 1946
British India	Rupee	Official[1]	3.32[2]	.30	April 22, 1946
Burma	Rupee	Official[1]	3.32[2]	.30	April 22, 1946
Sarawak Brunei and North Borneo	Straits Settlement Dollar	.....	[3]	[3]	.....
Japan	Yen	[4]	....	....	.....
Netherlands East Indies	Netherlands Indies Guilder	[5]	[5]	[5]	.....
U. S. S. R.	Ruble	Controlled	5.30	.1887	Feb. 1, 1946
Iran	Rial	Official	32¼	.031	May 1, 1946
Rumania	Lev	Official	[6]	[6]	.....
Poland	Zloty	Official	[7]	[7]	.....

* Based on actual selling rates for sight drafts on New York, in units of foreign currency, per dollar.

[1] Tied to £ Sterling.

[2] Based on buying rates in New York for cable transfers.

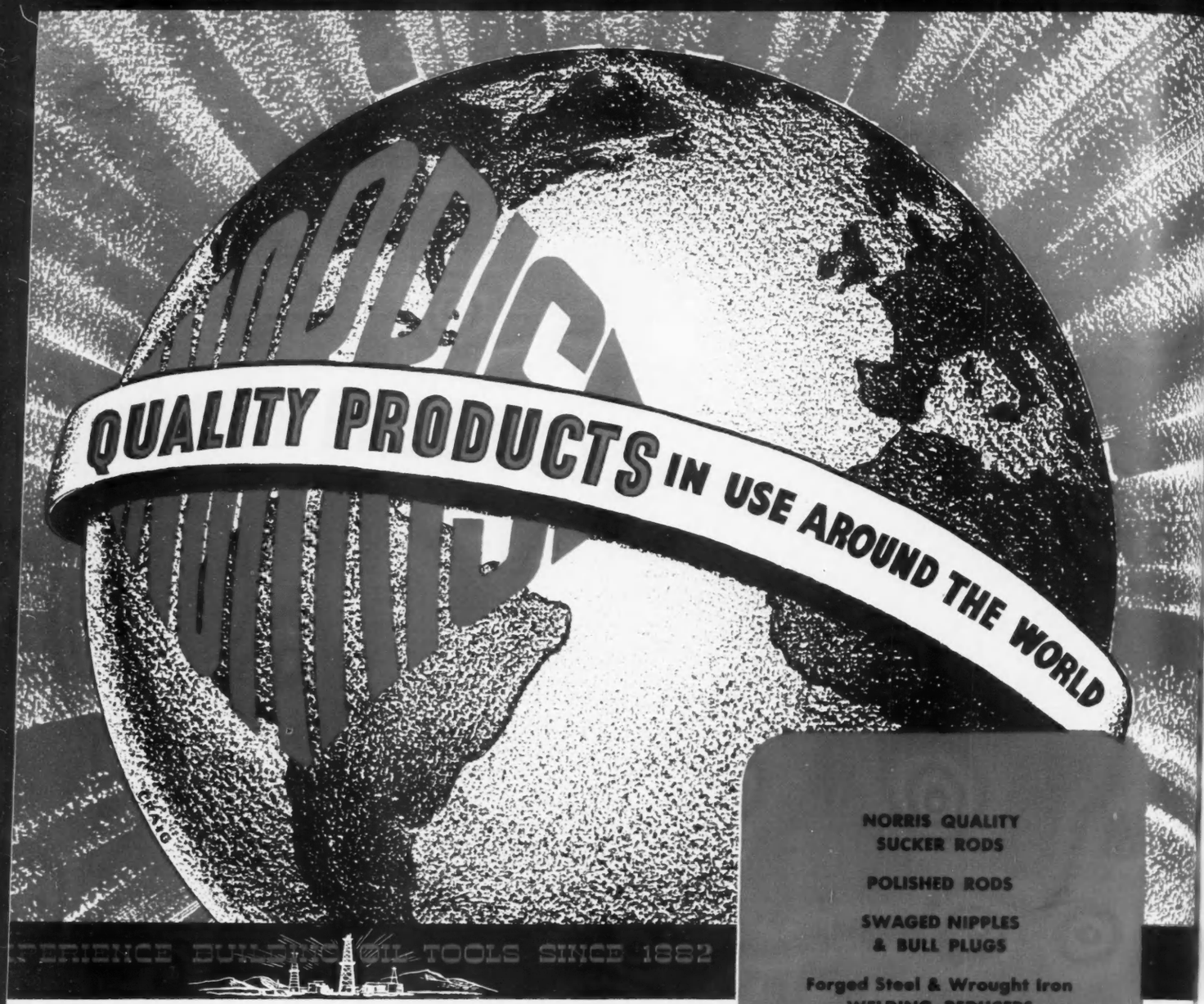
[3] Present official rate not yet available. As of 1943, the rate was $0.47.

[4] Rate controlled by Allied Occupation Forces.

[5] Rate not yet established. Rate for Netherlands guilder was $0.38 as of Feb. 1, 1946.

[6] Par value not yet established. See "**Foreign Commerce Weekly**", March 30, 1946.

[7] Par value not yet established. Conversion rate fixed for each individual transaction or group of transactions.



NORRIS QUALITY SUCKER RODS

POLISHED RODS

SWAGED NIPPLES & BULL PLUGS

Forged Steel & Wrought Iron WELDING REDUCERS

WELL HEAD EQUIPMENT

SURFACE EQUIPMENT

ROD LINE EQUIPMENT

DRILL ROD For Shot Hole, Exploration and Core Drilling

NORRIS TUBULAR PRODUCTS

NORRIS TUBING ELIMINATOR

THROUGHOUT the oil fields of the world you will find the familiar W. C. NORRIS trade mark—*identifying oil field equipment of highest quality for over 63 years.* Choice of careful buyers, the Petroleum Engineers, Superintendents and Production Men of long experience, who realize to secure ultimate economy of operation you must FIRST have maximum quality—*NORRIS and QUALITY have been synonymous.* It will pay you in lower production costs, fewer breakdowns and freedom from worry to know ALL the products that carry the NORRIS Label of Quality—*the oil man's yardstick of performance since* 1882. Just mail a postcard for complete descriptive bulletins on each of the NORRIS Products with which you would like to become more familiar.

W.C. NORRIS MANUFACTURER, INC.

TULSA, OKLAHOMA

BRANCHES
HOUSTON, KILGORE, ODESSA, TEXAS. SALEM, ILLINOIS
503 CONTINENTAL BUILDING, DALLAS, TEXAS

ARMY NAVY QUALITY MAKES FRIENDS

EXPORT OFFICE
ROOM 1940, 30 ROCKEFELLER PLAZA
NEW YORK CITY

WORLD PETROLEUM RESERVES

TOTAL proved petroleum reserves of the world, meaning oil definitely discovered but not yet produced, approximate 60 billion barrels. This is substantially more known future supply than has been produced during the whole past history of the petroleum industry, extending back over almost a century. It is 20 times greater than the 1945 rate of production, although the latter was at an all-time peak.

Furthermore, the world faces relatively bright possibilities for additional discoveries in the future. The potential possibilities are such as to indicate new discoveries should easily equal or exceed withdrawal rates for a good many years to come.

PROVED PETROLEUM RESERVES

The distribution of development petroleum reserves throughout the world is quite irregular and unequal, and the ownership of these reserves is largely concentrated in the hands of a few national interests, principally those of the United States and the British-Dutch. Likewise, the potential petroleum resources, meaning reserves not developed, are distributed among the various political subdivisions and national interests with great unevenness.

As of January 1, 1946, the actually proved world reserves of crude petroleum are estimated to total 58,911,813,000 barrels. That is substantially more known future supply than the 49,329,171,000 barrels actually produced during the whole past history of the petroleum industry. It means that 54 percent of all the petroleum reserves ever discovered still remains available to be produced in the future. At the 1945 rate of production, the quantity of known unproduced petroleum reserves were 20 times greater than current annual production of 2,783,021,000 barrels.

Slightly more than one-third of the proved petroleum reserves of the world are located in the United States. Almost another one-third of the world's known reserves are located

Location of World's Proved Petroleum Reserves Ownership by Principal National Interests

(Figures in Thousands of 42-Gallon Barrels)

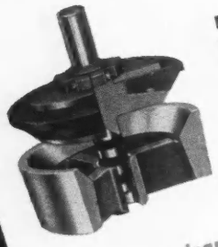
CONTINENT AND COUNTRY:	Estimated Proved Reserves Jan. 1, 1946	Percent of World Reserves	AMOUNT OWNED OR CONTROLLED BY NATIONAL INTERESTS[1]							
			By Own Interests[2]		By United States Interests		By British-Dutch Interests		By Other National Interests	
			Percent	Barrels	Percent	Barrels	Percent	Barrels	Percent	Barrels
Canada	150,000	0.25	....	.....	40	60,000	60	90,000	....	.....
Mexico	870,000	1.48	100	870,000	....	.....	....	.....	....	.....
United States	20,826,813	35.35	....	.....	96	19,993,740	4	833,073	....	.....
Cuba	3,000	0.01	100	3,000	....	.....	....	.....	....	.....
North America, Total	**21,849,813**	**37.09**	**4.00**	**873,000**	**91.78**	**20,053,740**	**4.22**	**923,073**	....	.....
Argentina	300,000	0.51	75	225,000	5	15,000	20	60,000	....	.....
Bolivia	50,000	0.09	100	50,000	....	.....	....	.....	....	.....
Brazil	1,000	0.00	100	1,000	....	.....	....	.....	....	.....
Colombia	500,000	0.85	....	.....	85	425,000	15	75,000	....	.....
Ecuador	25,000	0.04	10	2,500	....	.....	90	22,500	....	.....
Peru	160,000	0.27	....	.....	70	112,000	30	48,000	....	.....
Trinidad	300,000	0.51	....	.....	....	.....	100	300,000	....	.....
Venezuela	7,000,000	11.88	....	.....	80	5,600,000	20	1,400,000	....	.....
South America, Total	**8,336,000**	**14.15**	**3.44**	**278,500**	**73.80**	**6,152,000**	**22.86**	**1,905,500**	....	.....
Albania	25,000	0.04	100	25,000	....	.....	....	.....	....	.....
Czechoslovakia	3,500	0.01	100	3,500	....	.....	....	.....	....	.....
England	15,000	0.03	....	.....	....	.....	0.03	15,000	....	.....
France	10,000	0.02	100	10,000	....	.....	....	.....	....	.....
Germany	85,000	0.14	100	85,000	....	.....	....	.....	....	.....
Austria	75,000	0.13	50	37,500	25	18,750	25	18,750	....	.....
Hungary	75,000	0.13	....	.....	100	75,000	....	.....	....	.....
Italy	1,500	0.00	100	1,500	....	.....	....	.....	....	.....
Poland	50,000	0.08	50	25,000	....	.....	....	.....	50[3]	25,000
Roumania	500,000	0.85	20	100,000	13	65,000	40	200,000	27[4]	135,000
U. S. S. R.	8,000,000	13.58	100	8,000,000	....	.....	....	.....	....	.....
Other Europe	150	0.00	....	.....	....	.....	....	.....	100	150
Europe, Total	**8,840,150**	**15.01**	**93.75**	**8,287,500**	**1.80**	**158,750**	**2.64**	**233,750**	**1.81**	**160,150**
Egypt	75,000	0.13	....	.....	....	.....	100	75,000	....	.....
Other Africa	500	0.00	....	.....	....	.....	....	.....	100[5]	500
Africa, Total	**75,500**	**0.13**	....	.....	....	.....	**99.34**	**75,000**	**0.66**	**500**
Iran	6,000,000	10.14	....	.....	....	.....	100	6,000,000	....	.....
Iraq	4,750,000	8.06	....	.....	23.75	1,128,175	52.50	2,493,750	23.75[5]	1,128,125
Kuwait	4,000,000	6.79	....	.....	50	2,000,000	50	2,000,000	....	.....
Saudi Arabia	3,000,000	5.09	....	.....	100	3,000,000	....	.....	....	.....
Bahrein Island	250,000	0.42	....	.....	100	250,000	....	.....	....	.....
Qatar	500,000	0.85	....	.....	23.75	118,750	52.50	262,500	23.75[5]	.....
Middle East, Total	**18,500,000**	**31.40**	....	.....	**35.12**	**6,496,875**	**58.14**	**10,756,250**	**6.74[5]**	**1,246,875**
Burma	100,000	0.17	....	.....	....	.....	100	100,000	....	.....
India	35,000	0.06	....	.....	....	.....	100	35,000	....	.....
China	15,000	0.03	100	15,000	....	.....	....	.....	....	.....
Japan	35,000	0.06	100	35,000	....	.....	....	.....	....	.....
Sakhalin	50,000	0.08	100[6]	50,000	....	.....	....	.....	....	.....
Sarawak and Brunei	75,000	0.13	....	.....	....	.....	100	75,000	....	.....
Netherlands Indies	1,000,000	1.69	....	.....	39	390,000	61	610,000	....	.....
Far East, Total	1,310,000	2.22	7.64	100,000	29.77	390,000	62.59	820,000	....	.....
Asia, Total (Middle and Far East)	**19,800,000**	**33.62**	**0.50**	**100,000**	**34.76**	**6,886,875**	**58.44**	**11,576,250**	**6.30[5]**	**1,246,875**
Australia-New Zealand	100	0.00	....	.....	....	.....	100	100	....	.....
Other World	250	0.00	....	.....	....	.....	....	.....	....	.....
WORLD, TOTAL	**58,911,813**	**100.0**	**16.19**	**9,539,000**	**56.44**	**33,251,365**	**24.98**	**14,713,673**	**2.39**	**1,407,525**

[1] Ownership reserves calculated upon estimated percent ownership of national interests in various countries. [2] Ownership of own local interests is exclusively of the United States and British-Dutch interests, which are listed separately in above table. [3] Half of Poland's reserves credited to U. S. S. R., since proposed new boundary would include about half of Poland's oil fields. [4] Other interests in Roumania include 11 percent or 55,000 barrels for France. [5] Reserves of Middle East credited to others represent French interest in Iraq Petroleum Company. [6] Sakhalin belongs to U. S. S. R.

Get the job done right, with "AMERICAN" Oil Field Specialties

PUMP SPECIALTIES

"American" Slush Pump VALVE AND SEAT



Designed for modern, high pressure power pumps . . . with many exclusive features such as successive, 4-point contact of valve on seat to completely distribute load of valve-impact . . . and 3-web seat to give longer life!

Other "American" Pump Specialties include:

● Standpipe and Manifold Fittings ● Valve Seat Puller ● Slush Pump Rocker Arm ● Slush Pump Suction Hoist ● Slush Pump Compounding Valve ● Slush Pump Release Valve

DRILLING EQUIPMENT

"AMERICAN" BUG BLOWER

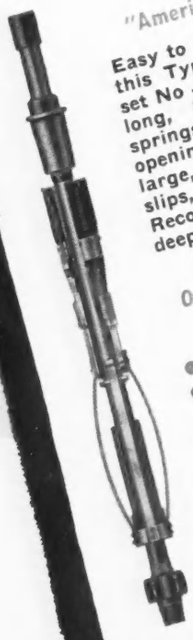
Widely used on drilling rigs for protection against insects and for cooling during hot weather . . . this fan is also used extensively in gasoline plants, warehouses, machine shops and industrial plants for cooling purposes.

Other "American" Drilling Equipment includes:

● Simplomatic Cathead, regular 30-in. and giant 42-in. heavy duty ● Rotary Drill Collars ● Forged Steel Upset Kellys ● Forged Steel Substitutes ● Steel Tool Box ● Boltless Hose Coupling ● Steel Tool House ● Combination Reverse and Throttle Lever ● Drill Pipe Float Valve ● Steel Casing Wagon

Production Equipment

"American" Type G Packer



Easy to set under all conditions, this Type "G" is a right-hand set No J-Tool Packer with extra long, heavy-duty friction springs. Also full tubing size opening through the packer; large, carefully heat-treated slips, and large bottom guide. Recommended for extremely deep and high-pressure wells.

Other "American" Production Equipment includes:

● Casing and Tubing Heads
● Type Z Bottom Hole Packer (anchor type)
● Type B & GB Combination Control Head Flow Packer
● Type X Control Head Packer
● Type Y "Criss Cross" Packer (cross-over type)
● Flow Packer
● Pumping Well Christmas Tree

FISHING TOOLS

"AMERICAN" OVERSHOTS

Available in 51 diameters . . . a size and type "American" Overshot for every fishing job. Ruggedly constructed; simple in design; quick, positive releasing action . . . with this all-purpose fishing tool and its accessories on your derrick floor, you are prepared for any fishing job!

Other "American" Fishing Tools include:

● Forged Steel Die Collars ● Overshot Guides ● Wall Hooks ● Milling Shoes ● Rock Bit Cone Fishing Socket ● Releasing and Circulating Spear ● Taper Taps ● Milling Tools

Catalog of complete line of "American" Oil Field Specialties sent free upon request.

AMERICAN
IRON & MACHINE WORKS CO.
OKLAHOMA CITY, OKLAHOMA
Office & Warehouse, Houston, Texas
Export Office: 420 Lexington Ave., New York City, N.Y.

Remember, there is an AMERICAN service man in every active field!

WORLD PETROLEUM RESERVES
Continued

in the Middle East area, much of which is immediately adjacent to the Persian Gulf. Of the remaining one-third, most is located in the Caribbean Sea area (Colombia, Venezuela and Trinidad) and in the U.S.S.R., these two regions accounting for 27 percent of the world's petroleum reserves. The remaining world's petroleum reserves, amounting to only 5 percent, are scattered through North America, South America, Europe and Asia.

The world's petroleum reserves are largely controlled by financial interests of the United States and British-Dutch.

United States interests not only control nearly all of the proved reserves of the United States, which comprises almost 34 percent of the world total, but also have large interests in the petroleum reserves of other countries. United States companies are estimated to own 22½ percent of the world's proved reserves outside the United States. Thus, financial interests of the United States control 56.4 percent of the world's reserves. The principal foreign holdings of the United States are in the Caribbean area and in the countries bordering on the Persian Gulf.

British-Dutch interests, which are largely in business partnership, control most of the proved reserves of the countries within these two empires, and also are very active in other countries. Within the two empires is only 1.17 percent of the world's reserves, and this is concentrated largely in the Netherlands portion of the East Indies. However, the British-Dutch interest control large reserves in other countries, especially in the Middle East. Elsewhere, the British-Dutch own 23.81 percent of the world's reserves, and consequently control 24.98 percent of the total.

In all, interests of the United States and British-Dutch control more than 80 percent of the proved world's reserve.

U.S.S.R. participation in world reserves is limited almost entirely to its own boundaries and accounts for 13.66 percent of the world total, or well more than half of that not controlled by American-British-Dutch interests. France controls a little more than 2 percent, largely due to holdings in the Middle East. Mexico accounts for 1½ percent of the world's reserves. All other nations hold but little more than 1 percent.

The world has large areas considered favorable for the occurrence of petroleum, and these have been developed or prospected to varied degrees.

Both the North American and South American continents are well endowed with petroleum possibilities, as indicated by their present producing rates. Asia has great potentialities, especially in the Middle East region surrounding the Persian Gulf. Europe has little prospects for prolific production outside of Russia, with the Caspian Sea and Ural-Volga area of the latter the most promising. Africa and Australia have very limited possibilities.

Foremost among the areas considered to have the greatest petroleum resources are:

1. The Mid-Continent and Gulf Coast regions of the United States.
2. The Middle East region, surrounding the Persian Gulf.
3. The Caribbean area, extending from Trinidad through Venezuela to Colombia.
4. The Caspian basin and Ural-Volga region of U.S.S.R.
5. The Ob basin of Western Siberia.
6. The Andean basin, extending from Trinidad to southern South America.

Ownership of World Petroleum Reserves
(Figures in Thousands of 42-Gallon Barrels)

Ownership	Reserves Owned (Barrels)			Percent of Total World Reserves Owned		
	In Own Country	In Other Countries	Total Reserves Controlled	In Own Country	In Other Countries	Total Percent
By United States Interests	19,973,740	13,277,625	33,351,365	33.90	22.54	56.44
By British-Dutch Interests	*690,100	14,023,573	14,713,673	1.17	23.81	24.98
By U. S. S. R.	8,050,000	†25,000	8,075,000	13.66	0.04	13.70
By French Interests	‡10,500	1,301,375	1,311,875	0.02	2.21	2.23
By Mexico	870,000	.....	870,000	1.48	....	1.48
Other Nationals	689,900	.....	689,900	1.17	....	1.17
Total	30,284,240	28,627,573	58,911,813	51.40	48.60	100.00

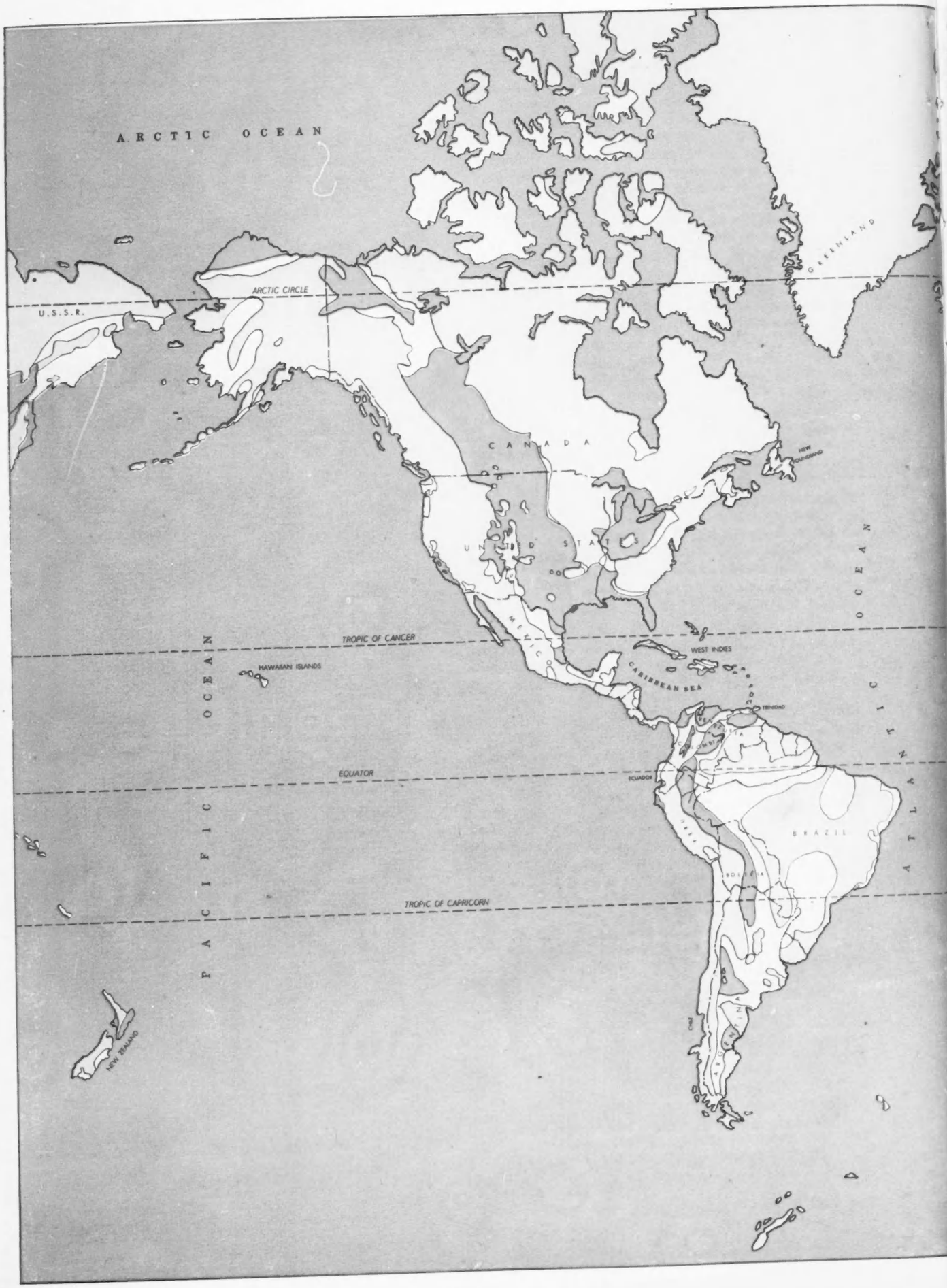
* Includes all British Empire. † Half of Poland's reserves credited to U. S. S. R. because proposed new boundary will include about half of Poland's oil fields. ‡ French Algeria and Morocco in addition to France itself.

Possibilities for Discovering New Petroleum Reserves, by Countries
(Second column shows "Order of Speculative Possibilities")

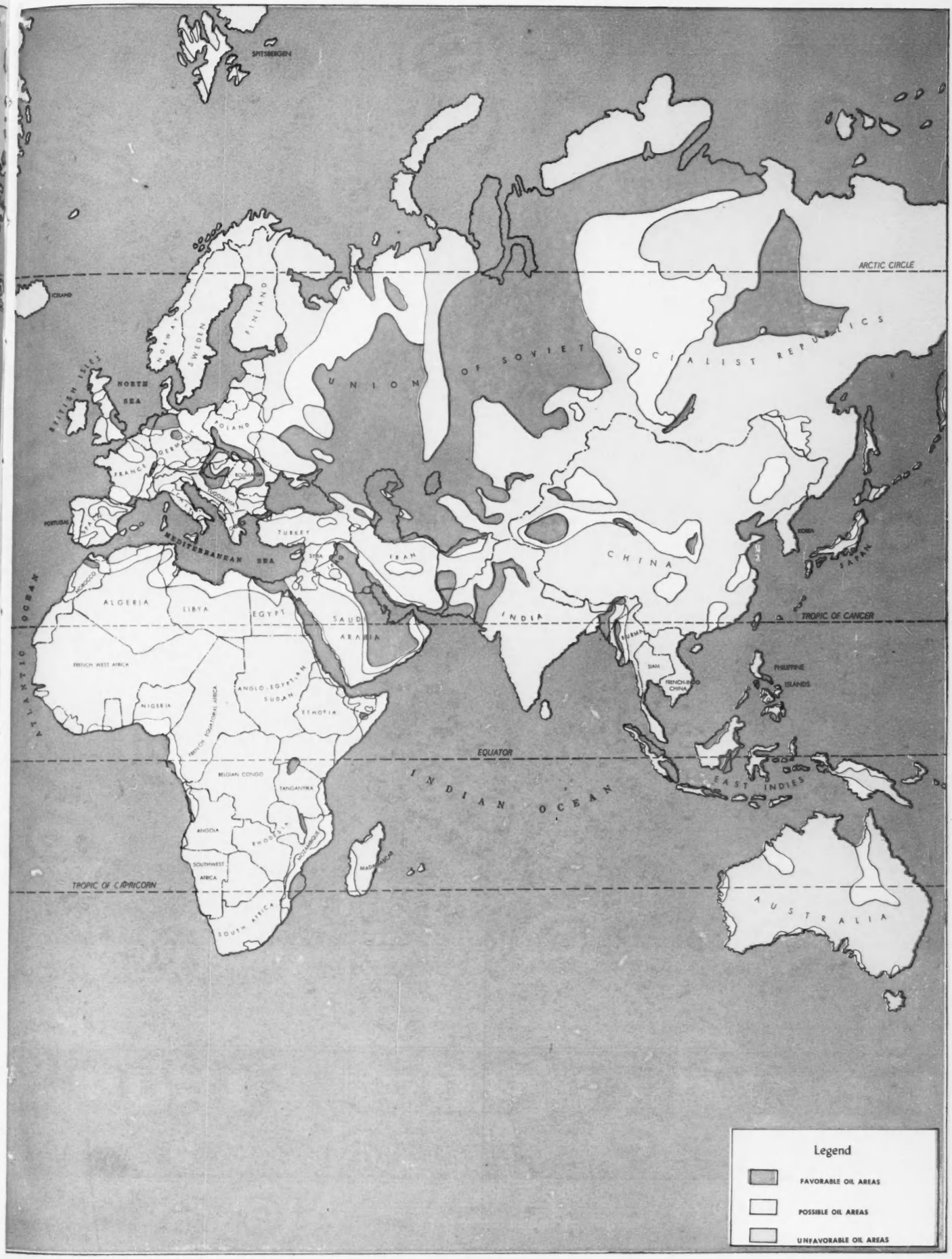
COUNTRY	Evaluation by Ernest O. Thompson[1]	Evaluation by G. C. Gester[2]
North America:		
United States	.....	II
Gulf Coast	Very Great	....
Mid-Continent (incl. W. Tex. and N. Mex.)	Very Great	....
Rocky Mountains	Large	....
California	Large	....
Eastern	Locally Important	....
Mexico	Large	III
Canada	Large	IV
Central America	Small	....
South America	.....	IV
Venezuela	Very Great	II
Colombia	Very Great	III
Peru	Large	VI
Ecuador	Locally Important	IV
Paraguay	Locally Import't (?)	....
Chile	Small	....
Argentina	Locally Important	IV
Bolivia	Locally Important	IV
Brazil	Small	....
Trinidad	.....	VI
Europe:		
Albania	Small	V
Austria	.....	IV
Czechoslovakia	Small	V
Denmark	Small	....
England	Small	....
Esthonia	Small	....
France	Small	....
Germany	Locally Important	V
Hungary	Locally Important	IV
Italy	Small	V
Poland	Locally Important	V
Roumania	Large	IV
Russia	.....	I
Baku Region	Very Great	....
North Caucasus	Very Great	....
Perm Basin	Very Great	....
Emba Region	Large	....
Spain	Small	....
Africa:		
Egypt	Locally Important	IV
Mozambique	Small	....
Angola	Small	....
French North Africa	Small	....
Madagascar	Small	....
Asia:		
Russia:		
East Ural	Large	....
Sakhalin	Large	....
North Artic	Locally Important	....
Turkmen Region	Very Great	....
Tadjikstan and Khirgez	Large	....
Iraq	Very Great	I
Iran	Very Great	I
Bahrein Island	Locally Important	
Kuwait	Large	
Qatar	Large	I
Saudi Arabia	Very Great	
Syria	Locally Important	....
Turkey	Small	....
Palestine	Small	....
Afghanistan	Locally Important	....
India	Locally Important	V
Burma	Locally Important	
Netherlands Indies	Large	II
Sarawak and Brunei	.....	VI
China	Small	VI
Japan	Small	VI
Australia	Small	....

[1] Member of Texas Railroad Commission. Data embodied in paper on "World Petroleum and Its Availability" presented at Fort Worth, October 25, 1943, before National Stripper Well Association; also used in several subsequent papers. Does not consider present discovered reserves.

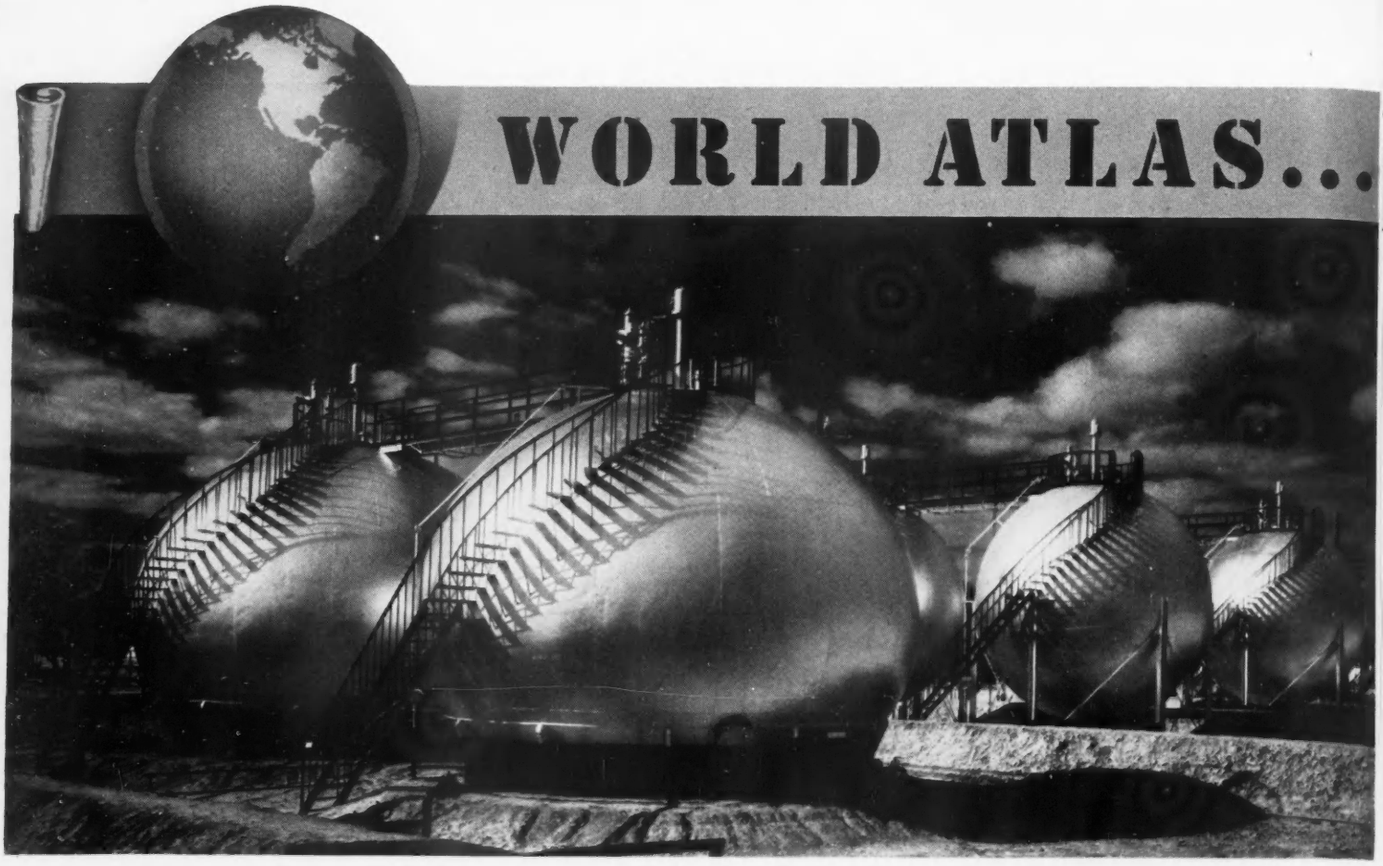
[2] Geologist, Standard Oil Company of California. Data shown in paper on "World Petroleum Reserves and Petroleum Statistics," Bulletin of American Association of Petroleum Geologists, October, 1944.


ARCTIC OCEAN
GREENLAND
ARCTIC CIRCLE
U.S.S.R.
CANADA
NEWFOUNDLAND
UNITED STATES
ATLANTIC OCEAN
TROPIC OF CANCER
WEST INDIES
HAWAIIAN ISLANDS
PACIFIC OCEAN
CARIBBEAN SEA
MEXICO
TRINIDAD
EQUATOR
ECUADOR
BRAZIL
BOLIVIA
TROPIC OF CAPRICORN
CHILE
ARGENTINA
NEW ZEALAND

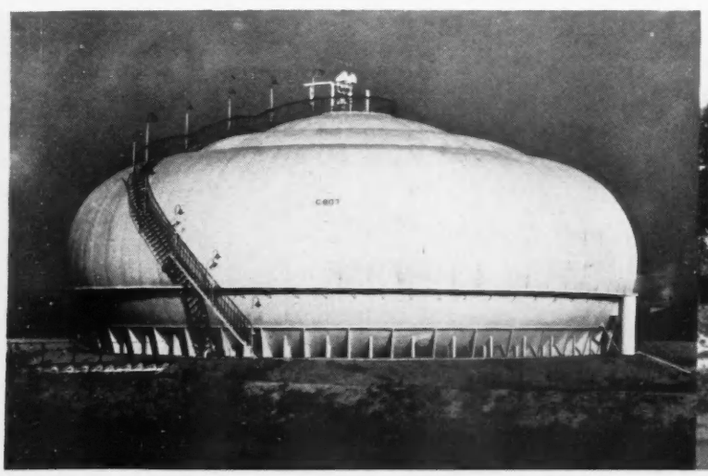
POSSIBILITIES



WORLD ATLAS...



HORTONSPHERES AND HORTONSPHEROIDS are two of the most effective storage tanks for preventing evaporation during the handling of hydrocarbons. *The two tanks at the left in the above view are 2,500-bbl. Hortonspheroids which operate at 15 lbs. per sq. in. pressure.* Vessels of this type are used to store hydrocarbons ranging in volatility from motor gasoline to natural gasoline. These smooth Hortonspheroids are built in capacities up to 40,000 bbls. *The tanks in the background are 1,500-bbl. Hortonspheres built for 75 lbs. per sq. in. pressure.* This type of vessel is used to store products that require pressures from 25 to 100 lbs. per sq. in. such as the more volatile grades of natural gasoline, butane, butane-propane mixture and volatile refinery charging stock.



HORTONSPHEROIDS . . . *of this type are available in capacities up to 120,000 bbls. and for pressures up to 20 lbs. per sq. in. The 80,000-bbl. Hortonspheroid shown above is of the noded design and operates at 10 lbs. per sq. in. pressure. Write for new Bulletin E which describes the Hortonspheroid in detail.*

HORTON FLOATING ROOFS . . . *are used on flat-bottom tanks to prevent evaporation losses and reduce fire hazard. They are recommended for use on tanks storing volatile products that do not boil at normal atmospheric temperature. Write for new bulletin describing in detail the* **improved** *Horton Floating Roof.*

CHICAGO BRIDGE & IRON

NEW YORK • CHICAGO • PHILADELPHIA • CLEVELAND • HOUSTON • WASHINGTON • LOS ANGELES • SAN FRANCISCO
BIRMINGHAM • ATLANTA • TULSA • DETROIT

WORLD CRUDE PRODUCTION

WORLD production of petroleum has been influenced by the abnormal situations caused by the War. It has alternately decreased and increased, in line with the changing war and post-war conditions. But the general trend during the war, as in prewar years, was upward, and output reached an all-time high in 1945, the final war year. In 1946 there will be a decrease. But this will be only a moderate and temporary let-down, and in 1947 there will be a resumption of the normal rising trend, as rehabilitation of the world proceeds. It is quite possible that this decline of 1946 will be fully canceled in 1947 or in other words that the record world production of 1945 will be equaled or exceeded as early as 1947.

1946 PROSPECTS

Even in the "let-down year" of 1946 there is in prospect a world production of at least 7,475,000 barrels daily, which would be only 150,000 a day or 2.0 percent less than the unprecedented 7,625,000 daily of 1945. For in the United States production is likely to average a minimum of 4,300,000 barrels daily, off about 8 percent from 1945, while for other countries another new high of 3,175,000 daily is a conservative estimate. These figures mean that U. S. production will be well above either 1938 or 1941 and that output in the remainder of the world will be 50 percent greater than in 1938, the last year before the war. They mean that world production in 1946 will be about 37 percent greater than in 1938 and about 23 percent greater than in 1941.

The increases in production above prewar will reflect especially the substantial gains for the United States, Venezuela, and the countries of the Middle East.

Beyond 1946, it is indicated that United States crude production will increase only moderately, but that output will be expanded some in South America and especially in the Middle East, as new pipe lines and refining facilities are constructed.

WARTIME TREND

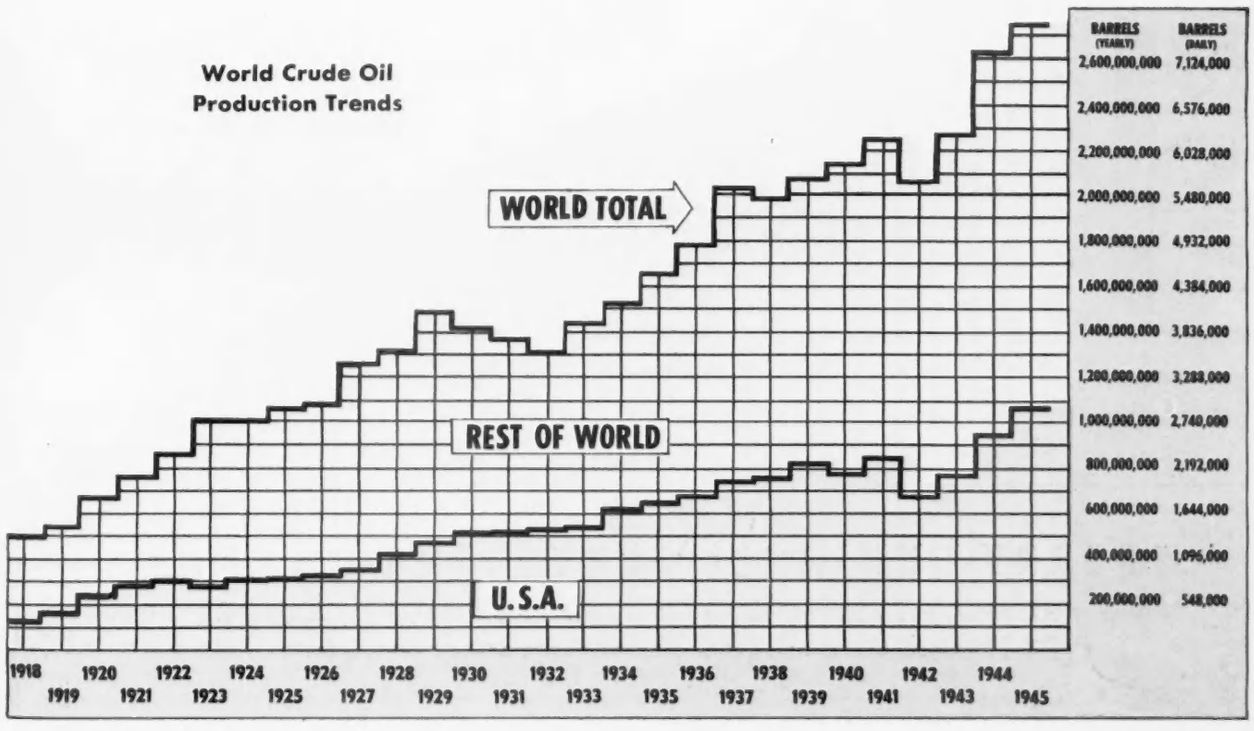
The wartime trend of world crude oil production has been as follows:

Daily Average Crude Production
(THOUSANDS OF BARRELS)

YEAR	United States	Rest of World	World Total
1938	3,327	2,120	5,447
1941	3,842	2,244	6,086
1944	4,584	2,566	7,150
1945	4,686	2,939	7,625
1946 (Estimated)	4,300	3,175	7,475
Percent Difference—1945–1946	−8.2	+8.0	−2.0

Two facts stand out prominently regarding the trend of world production of crude petroleum. The first is that neither peacetime nor wartime conditions at their worst have long interrupted the steady increase in production since World War I. Downturns are soon retraced, and demand and production climb to higher and higher levels, as the world makes increased use of this gift of nature. In the years which are to follow this latest war, the world will make greater use of machinery than it ever has before, and petroleum demand and production may be expected to show further remarkable expansion. There are rich known reserves from which this growing production can come. But even these do not look so great relatively, when one reviews the stairsteps by which production has climbed to the present high level and then looks forward and sees those stairsteps going on higher and higher.

■ CONTINUED ON PAGE 29



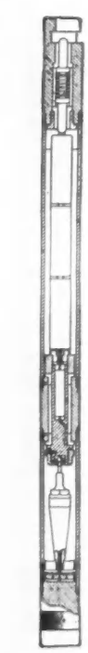
Make SPERRY-SUN

SPERRY-SUN'S

Instruments and Services a part of your drilling program

Throughout the world, over a period of years, Sperry-Sun Well Surveying Instruments and Technical Services have been among the producers' greatest aids in assuring fast, accurate and profitable drilling.

Anything less than the best in well surveys is poor economy. The Devices and Services mentioned below are recognized as outstanding contributions to the progress of the industry. Full information and literature upon request.



E-C
Inclinometer

SURWELL
Clinograph

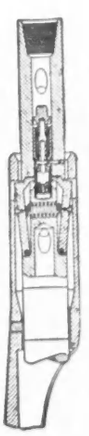
SYFO
Clinograph

M-M-O
Bottom Hole
Orientation

H-K
Single Shot

Polar Core
Orientation

S-S
Non-Magnetic
Drill Collar



K-K
Whipstock and
Retrieving Sub

SPERRY-SUN WELL SURVEYING COMPANY

OFFICES: PHILADELPHIA, PA.; HOUSTON, CORPUS CHRISTI, MARSHALL, ODESSA, TEXAS; LAFAYETTE, LA.; LONG BEACH, BAKERSFIELD, CALIF.; OKLAHOMA CITY, OKLA.; CASPER, WYO.

WORLD CRUDE PRODUCTION—Continued

SHIFT OF SOURCES

The second outstanding fact regarding world production is the shift now occurring in the distribution of the sources of supply. The war started and the postwar period will continue a shifting away from the United States of its former dominance in world production. Over the history of the industry, the U. S. has accounted for about 64 percent of world production, and the U. S. proportion has not been under 60 percent for 40 years, while it was over 67 percent in 1942. But in 1945 the U. S. part was cut to 61.8 percent, and in 1946 it will be down to about 57.5 percent. Several years from now the ratio may be even lower, although this is not a certainty.

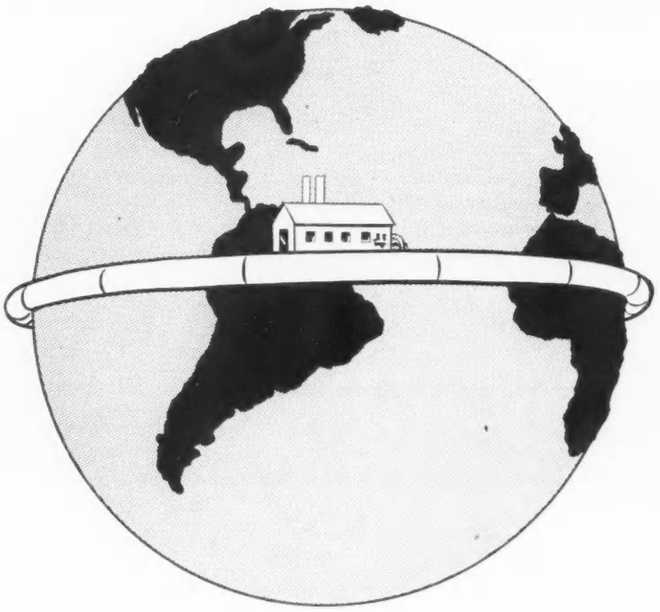
It has become possible for the world to depend relatively less on the United States in supplying world demand since the world industry has begun to develop upon large scale the rich resources now known to exist in Venezuela, Colombia, and especially the Middle East. Under the urgent needs imposed by the second World War, refining capacity was greatly expanded in both the Caribbean and Persian Gulf

Prewar and Recent Trends in World Crude Oil Production, by Countries, and Cumulative Production Through 1945

(All figures are from U. S. Bureau of Mines except those for 1945, which are from private sources or estimated by THE OIL WEEKLY)

Continent and County	ANNUAL PRODUCTION (Thousand of Barrels)			DAILY AVERAGE PRODUCTION (Actual Barrels)				YEAR'S PRODUCTION AS PERCENT OF WORLD			CUMULATIVE PRODUCTION TO JANUARY 1, 1946 (Thousands of Bbls.)	
	1938	1944	1945	1938	1944	1945	% Diff. '44-'45	1938	1944	1945	Total	As % of World
NORTH AMERICA—												
Canada	6,966	10,071	8,275	19,085	27,516	22,671	— 17.61	0.35	0.38	0.30	113,329	0.23
Mexico	38,506	38,200	41,975	105,496	104,372	115,000	+ 10.18	1.94	1.46	1.51	2,183,786	4.43
Trinidad	17,737	22,000	21,500	48,594	60,109	58,904	— 2.00	0.89	0.84	0.77	313,579	0.64
United States	1,214,355	1,677,753	1,711,103	3,327,000	4,584,024	4,687,953	+ 2.27	61.08	64.11	61.48	31,489,760	63.84
Other North America	78	150	150	214	410	411	+ 0.24	0.01	0.01	0.01	1,275	0.00
Total North America	1,277,642	1,748,174	1,783,003	3,500,389	4,776,431	4,884,939	+ 2.27	64.27	66.80	64.07	34,101,729	69.14
SOUTH AMERICA—												
Argentina	17,076	24,230	22,880	46,784	66,202	62,685	— 5.31	0.86	0.93	0.82	346,043	0.70
Bolivia	226	313	406	619	855	1,112	+ 30.06	0.01	0.01	0.02	3,112	0.01
Colombia	21,582	22,291	22,866	59,129	60,904	62,647	+ 2.86	1.09	0.85	0.82	370,946	0.75
Ecuador	2,246	2,892	2,664	6,153	7,902	7,299	— 7.63	0.11	0.11	0.10	36,601	0.07
Peru	15,839	14,386	13,747	43,395	39,306	37,663	— 4.18	0.80	0.55	0.49	332,386	0.68
Venezuela	188,174	257,046	321,902	515,545	702,311	881,923	+ 25.57	9.46	9.82	11.57	3,206,987	6.50
Brazil	.....	80	79	.....	219	216	— 1.37	.....	0.00	0.00	275	0.00
Total South America	245,143	321,238	384,544	671,625	877,699	1,053,545	+ 20.03	12.33	12.27	13.82	4,296,350	8.71
EUROPE—												
Albania	752	765	750	2,060	2,090	2,055	— 1.67	0.04	0.03	0.03	9,198	0.02
Czechoslovakia	130	185	175	356	505	479	— 5.15	0.01	0.01	0.01	3,615	0.01
England	.....	850	800	.....	2,322	2,192	— 5.60	.....	0.03	0.03	2,495	0.01
France	513	500	500	1,406	1,366	1,370	+ 0.29	0.02	0.02	0.02	13,743	0.03
Germany	3,861	7,600	7,000	10,578	20,765	19,178	— 7.64	0.19	0.29	0.25	80,395	0.16
Austria	383	9,760	7,350	1,049	26,667	20,137	— 24.49	0.02	0.37	0.26	35,828	0.07
Hungary	288	9,900	5,019	789	27,049	13,751	— 49.16	0.01	0.38	0.18	34,255	0.07
Italy	101	75	75	277	205	205	.....	0.01	0.00	0.00	3,146	0.01
Poland	3,763	3,000	3,000	10,310	8,197	8,219	+ 0.27	0.19	0.11	0.11	279,014	0.56
Roumania	48,487	25,634	34,010	132,841	70,038	93,178	+ 33.04	2.44	0.98	1.22	1,095,366	2.22
U.S.S.R. (Russia)	204,956	275,000	300,000	561,523	751,366	821,918	+ 9.39	10.31	10.51	10.78	5,646,759	11.44
Other Europe	9	10	10	25	27	27	.....	0.00	0.00	0.00	86	0.00
Total Europe	263,243	333,279	358,689	721,214	910,598	982,710	+ 7.92	13.24	12.73	12.89	7,203,900	14.60
AFRICA—												
Egypt	1,581	9,125	9,500	4,331	24,932	26,027	+ 4.39	0.08	0.35	0.34	89,213	0.18
Algeria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	143	0.00
Other Africa	27	30	25	74	82	69	— 15.85	0.00	0.00	0.00	245	0.00
Total Africa	1,608	9,155	9,525	4,405	25,014	26,096	+ 4.33	0.08	0.35	0.34	89,601	0.18
ASIA—												
Near East:												
Bahrein Island	8,298	6,714	7,309	22,734	18,344	20,025	+ 9.16	0.42	0.26	0.26	71,461	0.15
Iran (Persia)	78,372	104,985	140,525	214,718	286,844	385,000	+ 34.22	3.94	4.01	5.05	1,459,501	2.96
Iraq	32,643	27,958	31,845	89,433	76,388	87,247	+ 14.22	1.64	1.07	1.14	307,370	0.62
Saudi Arabia	495	7,794	21,311	1,356	21,295	58,386	+174.18	0.03	0.30	0.77	54,841	0.11
Total Near East	119,808	147,451	200,990	328,241	402,872	550,658	+ 36.68	6.03	5.64	7.22	1,893,173	3.84
Far East:												
Burma	7,538	750	750	20,652	2,049	2,055	+ 0.29	0.38	0.03	0.02	328,692	0.66
India, British	2,488	2,500	2,500	6,816	6,831	6,849	+ 0.26	0.12	0.10	0.09		
China	.....	505	500	.....	1,380	1,370	— 0.72	.....	0.02	0.02	1,892	0.00
Japan (incl. Taiwan)	2,511	3,000	2,500	6,879	8,197	6,849	— 16.45	0.13	0.11	0.09	97,509	0.20
Sakhalin	3,821	5,000	5,000	10,469	13,661	13,699	+ 0.28	0.19	0.19	0.18	59,240	0.12
Borneo, British (Sarawak & Brunei)	6,913	6,000	5,000	18,940	16,393	13,699	— 16.43	0.35	0.23	0.18	126,532	0.26
Netherlands India	57,318	40,000	30,000	157,036	109,290	82,192	— 24.79	2.88	1.53	1.08	1,129,391	2.29
Total Far East	80,589	57,755	46,250	220,792	157,801	126,712	— 19.70	4.05	2.21	1.66	1,743,256	3 53
Other Asia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Asia	200,397	205,206	247,240	549,033	560,672	677,370	+ 20.81	10.08	7.85	8.88	3,636,429	7.37
AUSTRALIA-NEW ZEALAND	4	5	5	11	14	14	.....	0.00	0.00	0.00	45	0.00
World Undistributed	4	14	15	11	38	41	+ 7.89	0.00	0.00	0.00	1,117	0.00
Total World	1,988,041	2,617,071	2,783,021	5,446,688	7,150,467	7,624,715	+ 6.63	100.00	100.00	100.00	49,329,171	100.00

MEN, METHODS *and* MACHINES



Plus 31 Years' Experience For Building Tomorrow's Pipe Lines

Williams Brothers Corp. has all three elements essential to successful pipe line construction: The best Skilled Workmen that experience and training can develop; the best methods American Engineers can perfect; the best Machines American Manufacturers can produce.

Since 1915 Williams Brothers Corp. and affiliated companies have built more than 30,000 miles of pipe line, scores of pump stations. In all sections of the United States, from Canada to South America and overseas, this organization has built great arteries that carry the life blood of freedom and industry across swamps, over rivers and through mountains of several countries on two continents. From this broad experience our staff of engineers and executives offer a specialized service to the pipe line industry of the world.

WILLIAMS BROTHERS CORP.

ENGINEERS – CONTRACTORS

Oil • Gas • Gasoline • Water
Pipe Line and Pump Stations

NEW YORK • TULSA • ATLANTA • HOUSTON

WORLD CRUDE PRODUCTION—Continued

regions, and crude production was proportionally increased. Considerable drilling was required in South America, and some was necessary in the Middle East.

Whereas Venezuela produced 515,545 barrels daily on the average in 1938, output was sharply expanded until it averaged 881,923 barrels daily in 1945, with the production of late 1945 (November) averaging 1,001,850 barrels daily. It is indicated that production will continue around or above one million barrels daily, in line with the expectations that there will be henceforth a full utilization of all refining capacity outside the United States. The United States alone is expected to import from Venezuela in 1946 at least 65,000 barrels a day of crude and heavy fuel oils over and above the imports of 1945, to meet large demand for fuels. Under planning of the Petroleum Administration for War prior to the end of the war, the program called for expansion of Venezuelan production to a minimum of 1,120,000 barrels daily. It is not clear exactly what the end of the war will do to this program, but the world demand for both light and heavy fuel oils has run considerably higher than expected in the postwar period and apparently will continue heavy. It appears conservative to assume, therefore, that Venezuelan production will continue undiminished or further increase.

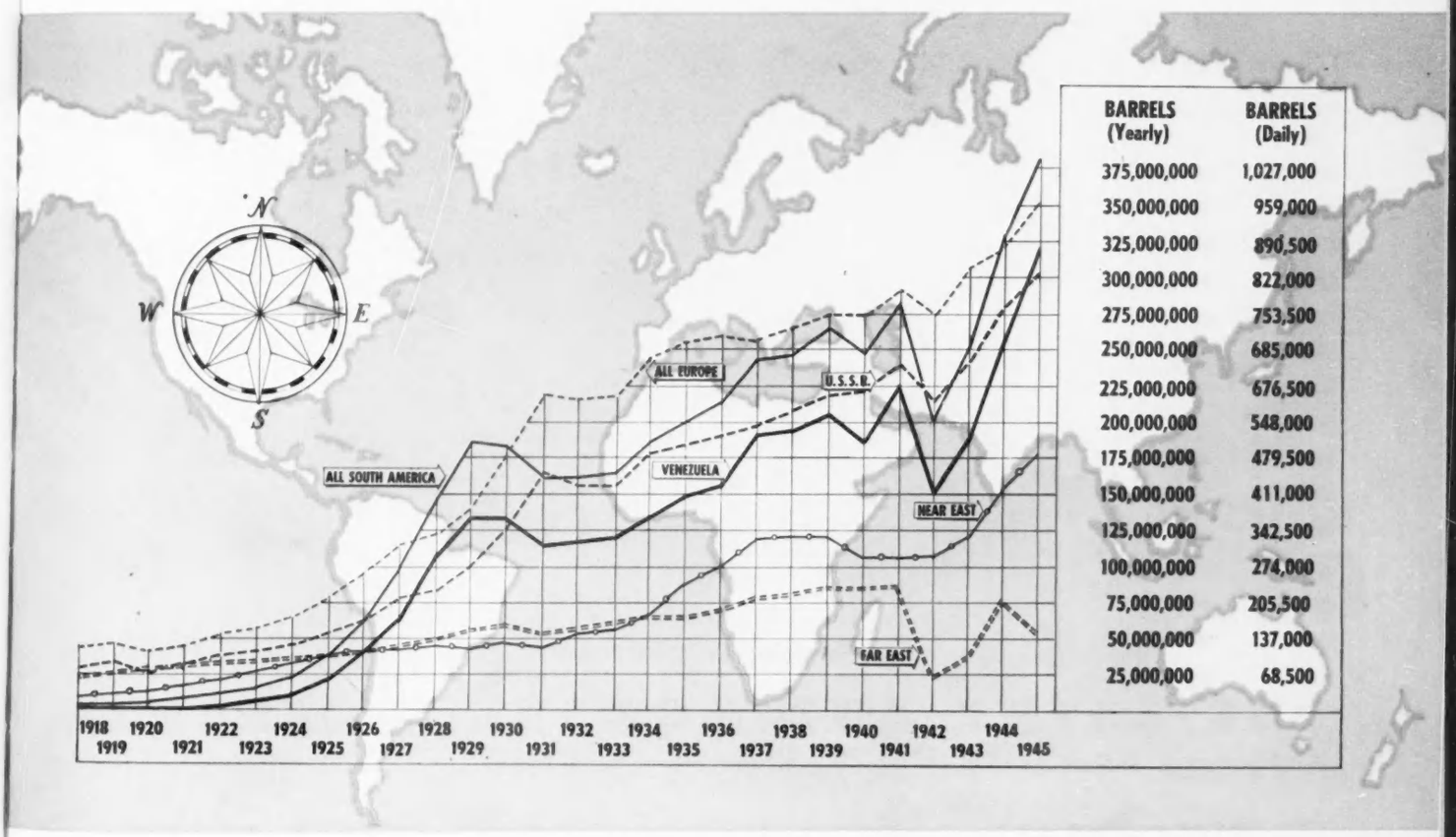
Mexico likewise produced more in 1945 than the previous year, and may be expected to show some further gain in 1946. Mexico produced 43,402,852 barrels in 1945, a daily average of 118,909 barrels, with production at the end of the year averaging 118,912 barrels daily. The country has been consistently showing substantial annual increase in domestic consumption, which largely absorbs domestic production. In 1944 Mexico produced 37,716,004 barrels.

THE NEAR EAST

The Near East has shown expansion of production similar to that of Venezuela. Output in the Near East totaled 328,241 barrels daily in 1938, 402,872 daily in 1944, and 550,658 barrels daily in 1945. In 1946 production will further increase considerably, it is indicated, as added refining and pipe line capacity will provide substantial new market for production, particularly in Saudi Arabia. In that country production averaged 58,386 barrels daily for the year 1945, but early in 1946 output exceeded 125,000 barrels daily and was expected to reach 150,000 daily in the spring of 1946, on completion of new pipe line facilities. Following completion in December, 1945, the new Ras Tanura refinery in Arabia is in operation with capacity of 75,000 barrels daily. The adjacent Bahrein refinery, processing Bahrein and Arabian crudes, is running over 60,000 barrels daily and soon will increase its throughput to more than 80,000 barrels daily. Through use of these new facilities, Saudi Arabian crude production will be about 85,000 barrels a day greater in 1946 than in 1945.

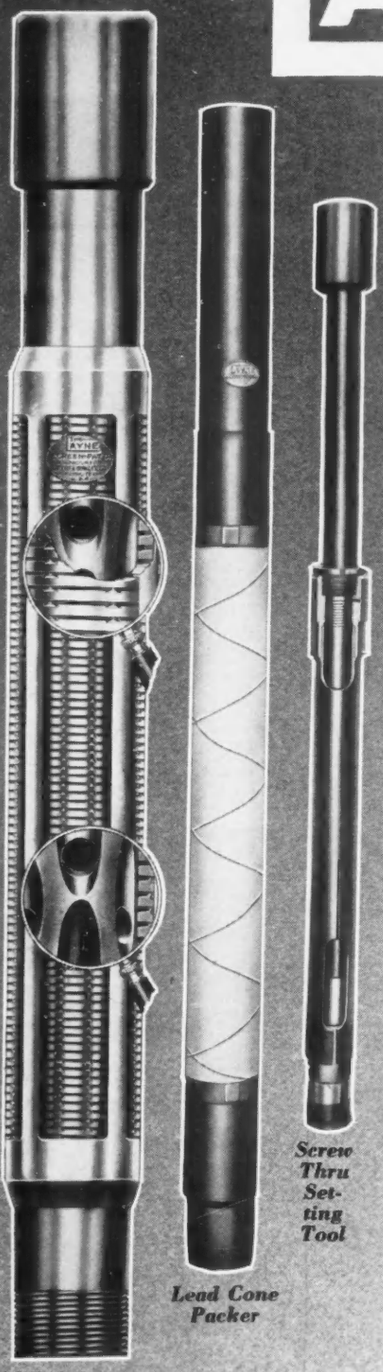
Kuwait will become a producing country on completion in 1946 of a 30,000 barrel daily capacity pipe line to a tanker terminal on the Persian Gulf. Other expansion in the Middle East will affect production materially in 1947 but not much in 1946.

Crude Oil Production Trends of Principal Producing Areas Outside the U. S.



THE LAYNE

Known the WORLD OVER



☆ LAYNE *Wire Wrapped Screen*

Wrapped with a flat bottomed "V" shaped wire. Gauge openings are uniform—screen rigid. Can be furnished with openings any gauge desired, with a choice of galvanized steel, admiralty brass, bronze or stainless steel wire, on any size or length of pipe with plain drilled holes, milled groove or vertical slotted openings.

☆ LAYNE *Screw Thru Packer*

This Packer has 42" of finely woven canvas wrapping, which when set is compressed to approximately 20", assuring a pack that needs neither fingers nor slips to prevent the packer creeping up when exposed to high pressures. Layne Packers are made for all sizes of liner, screen and casing and can be set at any depth with either drill stem or tubing. A spear or trap will remove packer if necessary.

☆ LAYNE *Screw Thru Setting Tool*

This tool is the simplest, most fool-proof setting tool on the market. When setting string is rotated eleven turns to right, the tool disengages from packer and will drop about 25 inches. It is impossible to set packer without first freeing the setting tool. The tool does not unscrew from the packer to release—instead the threads are disengaged by contraction.

For Complete Information Write

THE LAYNE AND BOWLER COMPANY

EXPORT:
E. H. (Gene) Trammell
Room 1636
30 Rockefeller Plaza
New York, N. Y.

General Office & Factory

8000 Market Street **Houston, Texas**

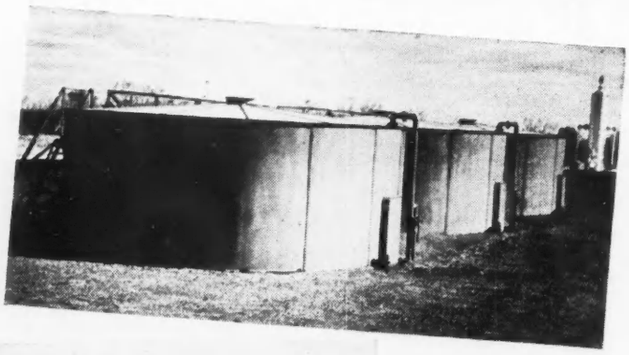
WEST COAST:
Layne & Bowler Corp.,
900 Santa Fe Ave.,
Los Angeles, Cal.

World Crude Oil Production, by Countries, by Years

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. *Sources: Mineral Resources and Minerals Yearbook, except as otherwise indicated)*

	NORTH AMERICA						SOUTH AMERICA							
YEAR	Canada	Mexico	Trinidad	United States	Other North America	Total North America	Argentina	Bolivia	Colombia	Ecuador	Peru	Venezuela	Brazil	Total South America
1857														
1858														
1859				2		2								
1860				500		500								
1861				2,114		2,114								
1862	12			3,057		3,069								
1863	83			2,611		2,694								
1864	90			2,116		2,206								
1865	110			2 498		2,608								
1866	175			3.598		3,773								
1867	190			3,347		3,537								
1868	200			3,646		3,846								
1869	220			4,215		4,435								
1870	250			5,261		5,511								
1871	270			5,205		5,475								
1872	308			6,293		6,601								
1873	365			9,894		10,259								
1874	169			10,927		11,096								
1875	220			8,788		9,008								
1876	312			9,133		9,445								
1877	312			13,350		13,662								
1878	312			15.397		15,709								
1879	575			19,914		20,489								
1880	350			26,286		26,636								
1881	275			27,661		27,936								
1882	275			30 350		30,625								
1883	250			23,450		23,700								
1884	250			24,218		24,468								
1885	250			21,859		22.109								
1886	584			28,065		28.649								
1887	526			28,283		28,809								
1888	695			27.612		28,307								
1889	705			35,164		35,869								
1890	795			45,824		46,619								
1891	755			54,293		55,048								
1892	780			50,515		51,295								
1893	798			48,431		49,229								
1894	829			49,344		50,173								
1895	726			52,892		53,618								
1896	727			60.960		61,687					47			47
1897	710			60,476		61,186					71			71
1898	758			55,364		56,122					71			71
1899	808			57.071		57,879					89			89
1900	913			63,621		64 534					274			274
1901	757	10		69,389		70,156					275			275
1902	531	40		88.767		89,338					287			287
1903	487	75		100,461		101,023					278			278
1904	553	126		117,081		117,760					290			290
1905	634	251		134,717		135,602					373			373
1906	569	502		126,494		127,565					531			531
1907	789	1,005		166 095		167,889	[D]				751			751
1908	528	3,933	[D]	178,527		182,988	12				945			957
1909	421	2,714	57	183,171		186,363	18				1,411			1,429
1910	316	3,634	143	209,557		213,650	20				1,258			1,278
1911	291	12,553	285	220,449		233,578	13				1 465			1,478
1912	243	16,558	437	222.935		240,173	47				1,752			1,799
1913	228	25.696	504	248,446		274,874	131				2.071			2,202
1914	215	26.235	644	265,763		292,857	276				1,837			2,113
1915	215	32,911	750	281,104		314,980	513				2,579			3,092
1916	198	40,546	929	300,767		342,440	867				2,593			3,460
1917	214	55,293	1,602	335,316		392,425	1,218			57	2,577	120		3,972
1918	305	63,828	2,082	355,928		422,143	1,353			[E]60	2,527	333		4,273
1919	241	87,073	1,841	378.367		467,522	1,331			[E]60	2,628	425		4,444
1920	196	157,069	2,083	442,929		602,277	1,651			[F]60	2,817	457		4,985
1921	188	193,398	2,354	472,183		668,123	2,036		67	[E]60	3,699	1,433		7,295
1922	179	182,278	2,445	557,531		742,433	2.866		323	[E]60	5.314	2,201		10,764
1923	170	149,585	3,051	732,407		885,213	3,400		425	87	5,699	4,201		13,812
1924	161	139.678	4,057	713,940		857,836	4.639		445	[E]100	8,379	9.042		22,605
1925	332	115,515	4,387	763.743		883,977	6 336		1,007	160	9.232	19.687		36,422
1926	364	90,421	4,971	770,874		866,630	7 851		6.444	214	10,762	36,911		62,182
1927	477	64.121	5.380	901,129		971,107	8,630		15,014	537	10,127	63,134		97,442
1928	624	50,151	7,684	901,474		959,933	9,070		19.897	1,084	12,006	105,749		147,806
1929	1,117	44,688	8,716	1,007,323		1,061,844	9,391	[D]	20,385	1,381	13,422	137.472		182,051
1930	1,522	39,530	9.419	898,011		948,482	9,002	56	20,346	1,553	12,449	136,669		180,075
1931	1,543	33.039	9,744	851,081		895,407	11,709	25	18,237	1,762	10,089	116.613		158,435
1932	1,044	32,805	10,126	785,159		829,134	13,139	44	16,414	1,597	9.899	116,541		157,634
1933	1.145	34,001	9,561	905,656	23	950,386	13.691	112	13.158	1.620	13,257	117,720		159,558
1934	1,417	38,172	10.894	908,065	28	958,576	14,024	159	17,341	1 637	16,314	136,103		185,578
1935	1.447	40.241	11.671	996 596	47	1,050,002	14,297	164	17.598	1.732	17.067	148.254		199,112
1936	1,500	41,028	13,237	1,099,687	62	1,155,514	15.458	105	18,756	1,942	17,593	154.794		208,648
1937	2.944	46.907	15.503	1,279.160	33	1,344,547	16.355	122	20,599	2.161	17,457	186.230		242,924
1938	6,966	38,506	17.737	1.214,355	78	1,277 642	17.076	226	21,582	2.246	15,839	188.174		245,143
1939	7 8 8	42,898	19,270	1,264,962	112	1,335,080	18,613	215	23,857	2,313	13,508	206,470		264,976
1940	8,591	44,036	20,219	1,353,214	142	1,426,202	20,609	288	25,593	2,349	12,126	185,570	2	246,537
1941	10,134	42,196	21,211	1,402,228	150	1,475,919	21,873	235	24,553	1,557	11,935	223,430	3	288,586
1942	10,365	35,152	25,700	1,386,645	150	1,458,012	23,704	308	10,487	2,278	13,629	147,675	31	198,112
1943	10,052	35,213	21,385	1,505,613	150	1,572,413	27,714	334	13,261	2,378	14,654	177,631	80	236,052
1944	10,071	38,200	22,000	1,677,753	150	1,748,174	24,230	313	22,291	2,892	14,386	257,046	80	321,238
1945[J]	8.275	41,975	21,500	1,711,103	150	1,783,003	22,880	406	22,866	2,664	13,747	321,902	79	384,544
Total	113,329	2,183,786	313,579	31,489,760	1.275	34,101,729	346,043	3,112	370,946	36,601	332,386	3,206,987	275	4,296,350

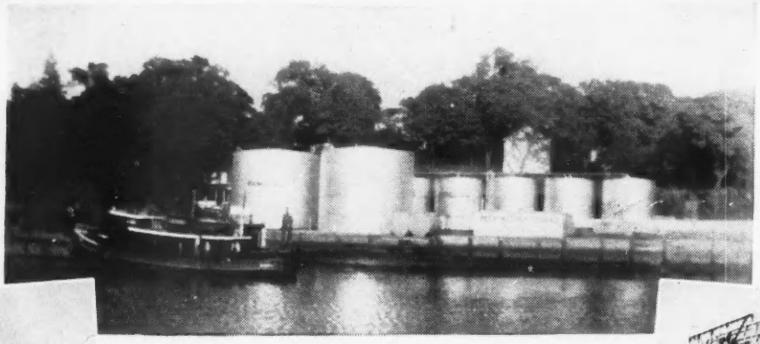
[A] Separation of Burma and India prior to 1935 not available from U. S. Bureau of Mines data here used. Data by L. Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulatives through 1934 as follows, Burma 184,528, India 20,756. [B] Includes fields in Russian Asia other than Sakhalin. [C] Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. [D] Less than 1000 barrels. [E] Approximate production. [F] No more data available. [G] Year Ended September 30. [H] Beginning of production in Brueni. [I] France's earlier production credited to Germany. [J] 1945 estimated by the Oil Weekly. [K] Bureau of Mines combination figure distributed by estimate of The Oil Weekly.



Above — Seven Butler 1,000 bbl. Tanks for Gasoline Storage.

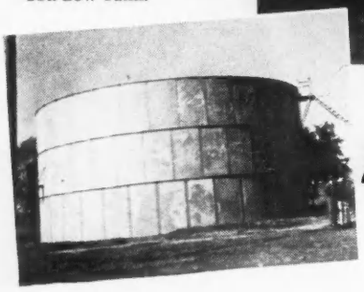
At right — Butler-Built Salt Water Terminal for Gasoline and Oil—Total Capacity 8,000 bbl.

Below — Butler 10,000 bbl. Low Tank.



Above—Battery of Butler 500 bbl. Low Oil Field Tanks.

Below—500 bbl. Butler High Tanks, Stairs and Walkways.



BUTLER BUILT
Reg. U. S. Pat. Off.

BOLTED STEEL TANKS

Compact in Shipment... Easy to Erect... Versatile in Use

Bolted Steel Storage Tanks, Walkways and Stairs of every size and for a multitude of purposes are fabricated by Butler for the oil fields of the world. These tanks are compact to ship in their plate form, packed for ease of assembly on the site. Their construction features have been proved in war service. When required, they can be quickly taken down, moved and re-erected at another location, with virtual full salvage.

Their fire-safety, structural strength and economy make Butler Bolted Steel Tanks ideal for all types of petroleum storage at oil fields and refineries. Special leakproof packing is provided for gasoline and light oil storage at terminals.

Butler engineering service is available to assist you in planning your petroleum storage facilities by selecting the best and most economical type of Bolted Steel Tank.

BUTLER MANUFACTURING COMPANY

Export Office: 7354 East 13th Street
Kansas City 3, Missouri, U. S. A.

BUTLER BUILT
Reg. U.S. Pat. Off.

BOLTED STEEL TANKS
STAIRWAYS & WALKWAYS

World Crude Oil Production, by Countries, by Years — (Continued)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. *Sources: Mineral Resources and Minerals Yearbook,* except as otherwise indicated)

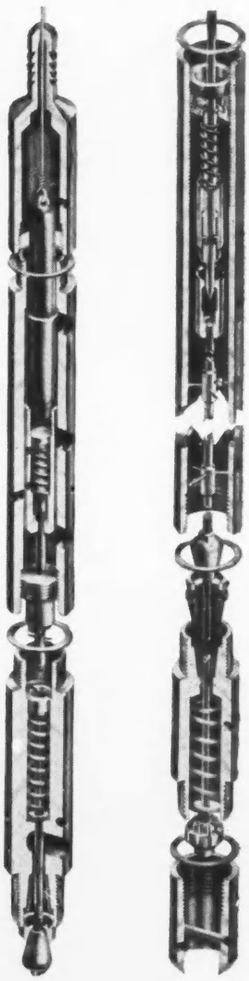
	EUROPE													AFRICA			
YEAR	Albania	Czechoslovakia	United Kingdom	France	Germany	Austria	Hungary	Italy	Poland	Roumania	[B]U.S.S.R. (Russia)	Other Europe	[B]Total Europe	Egypt	Algeria	Other Africa	Total Africa
1857										2			2				
1858										4			4				
1859										4			4				
1860								D		9			9				
1861								D		17			17				
1862								D		23			23				
1863								D		28	41		69				
1864								D		33	65		98				
1865								2		39	67		108				
1866								1		42	83		126				
1867								1		51	120		172				
1868								D		56	88		144				
1869								D		59	202		261				
1870								D		84	204		288				
1871								D		90	165		255				
1872								D		91	185		276				
1873								D		104	475		579				
1874								1	150	103	583		837				
1875								1	158	108	697		964				
1876								3	164	111	1,321		1,599				
1877								3	170	108	1,801		2,082				
1878								4	176	109	2,401		2,690				
1879								3	215	110	2,761		3,089				
1880					9			2	229	115	3,001		3,356				
1881					29			1	287	122	3,601		4,040				
1882					58			2	330	136	4,538		5,064				
1883					27			2	365	139	6,002		6,535				
1884					46			3	408	211	10,805		11,473				
1885					41			2	465	193	13,925		14,626				
1886					74			2	306	168	18,006		18,556				
1887					74			1	344	182	18,368		18,969				
1888					85			1	467	219	23,049		23,821				
1889					68			1	515	298	24,609		25,491				
1890					108			3	659	383	28,691		29,844				
1891					109			8	631	488	34,573		35,809				
1892					101			18	646	593	35,775		37,133				
1893					100			19	693	535	40,457		41,804				
1894					123			21	949	508	36,375		37,976				
1895					121			26	1,453	576	46,140		48,316				
1896					145			18	2,444	543	47,221		50,371				
1897					166			14	2,226	571	54,399		57,376				
1898					184			15	2,376	776	61,610		64,961				
1899					192			16	2,314	1,426	65,955		69,903				
1900					358			12	2,347	1,629	75,780		80,126				
1901					314			16	3,251	1,678	85,168		90,427				
1902					354			19	4,142	2,060	80,540		87,115				
1903					446			18	5,235	2,763	75,591		84,053				
1904					637			26	5,947	3,599	78,537		88,746				
1905					561			44	5,766	4,421	54,960		65,752				
1906					579			54	5,468	6,378	58,897		71,376				
1907					757			60	8,456	8,118	61,851		79,242				
1908					1,009			51	12,612	8,252	62,187		84,111				
1909					1,019			42	14,933	9,327	65,970		91,291				
1910					1,032			51	12,673	9,724	70,337		93,817				
1911					1,017			75	10,519	11,108	66,184		88,903	21			21
1912					1,031			54	8,535	12,976	68,019		90,615	214			214
1913					857			47	7,818	13,555	62,834		85,111	98			98
1914					781			40	6,436	12,827	67,020		87,104	753	1		754
1915					703			44	5,352	12,030	68,548		86,677	212	4		216
1916					656			51	6,587	8,945	65,817		82,056	404	8		412
1917				[I]	642			41	6,228	3,721	63,072		73,704	943	9		952
1918				363	270			35	6,032	8,730	27,168		42,598	1,935	7		1,942
1919		48	2	344	265			35	6,096	6,618	31,752		45,150	1,517	5		1,522
1920		69	3	356	246			35	5,607	7,435	25,430		39,181	1,042	4		1,046
1921		94	3	389	274			32	5,167	8,368	28,968		43,295	1,255	3		1,258
1922		120	1	496	319			31	5,227	9,843	35,692		51,729	1,188	9		1,197
1923		74	1	494	346			34	5,402	10,867	39,147		56,365	1,054	9		1,063
1924		76	2	497	406			39	5,657	13,369	45,355		65,401	1,122	11		1,133
1925		158	3	459	541			61	5,960	16,650	52,448		76,280	1,226	12		1,238
1926		150	2	478	653			41	5,844	23,314	64,311		94,793	1,188	9		1,197
1927		112	2	504	663			47	5,342	26,368	77,018		110,056	1,267	8		1,275
1928		94	1	512	630			46	5,492	30,773	[G]84,745		122,293	1,842	8		1,850
1929		93		535	704			45	4,988	34,758	[G]99,507		140,630	1,868	20		1,888
1930		157	[D]	523	1,182			59	4,904	41,624	[G]125,555		174,004	1,996	16		2,012
1931		134	[F]	520	1 606			124	4,662	49,127	162,842		219,015	2,038	[F]		2,038
1932		126	[F]	530	1,608			208	4,116	53,815	154,367		214,770	1,895	[F]		1,895
1933	11	122	[F]	562	1,665			204	4,072	54,020	154,840		215,496	1,663	[F]		1,663
1934	10	178	[F]	557	2,187			151	3,913	62,063	174,318		243,377	1,546	[F]		1,546
1935	41	133	[F]	541	2,996	44		119	3,812	61,310	182,386	2	251,384	1,301	[F]	4	1,305
1936	273	127	[F]	503	3,115	50		123	3,789	63,659	186,206	1	257,846	1,278	[F]	4	1,282
1937	619	123	[F]	502	3,176	221	16	110	3,716	52,452	193,241	4	254,180	1,196	[F]	22	1,218
1938	752	130	[F]	513	3,861	383	288	101	3,763	48,487	204,956	9	263,243	1,581	[F]	27	1,608
1939	934	120	...	500	4,487	1,240	1,103	91	3,898	45,648	216,866	10	274,897	4,666	[F]	27	4,693
1940	1,497	163	...	496	4,544	2,480	1,755	57	3,891	42,644	218,600	10	276,137	6,505	[F]	27	6,532
1941	1,381	183	...	479	4,438	2,700	2,474	77	3,319	40,913	238,150	10	294,124	8,546	[F]	27	8,573
1942	1,450	271	...	500	4,500	3,800	4,000	77	3,400	41,558	227,470	10	287,036	8,275	[F]	27	8,302
1943	715	200	825	600	6,500	7,800	9,700	75	3,500	38,631	200,750	10	269,306	8,953	[F]	25	8,978
1944	765	185	850	500	7,600	9,760	9,900	75	3,000	25,634	275,000	10	333,279	9,125	[F]	30	9,155
1945[J]	750	175	800	500	7,000	7,350	5,019	75	3,000	34,010	300,000	10	358,689	9,500	[F]	25	9,525
Total	9,198	3,615	2,495	13,743	80,395	35,828	34,255	3,146	279,014	1,095,366	5,646,759	86	7,203,900	89,213	143	245	89,601

[A] Separation of Burma and India prior to 1935 not available from U. S. Bureau of Mines data here used. Data by L. Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulatives through 1934 as follows, Burma 184,528, India 20,756. [B] Includes fields in Russian Asia other than Sakhalin. [C] Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. [D] Less than 1000 barrels. [E] Approximate production. [F] No more data available. [G] Year Ended September 30. [H] Beginning of production in Brunei. [I] France's earlier production credited to Germany. [J] 1945 estimated by the Oil Weekly. [K] Bureau of Mines combination figure distributed by estimate of The Oil Weekly.

EQUIPMENT IN WORLD-WIDE USE

Special Instruments

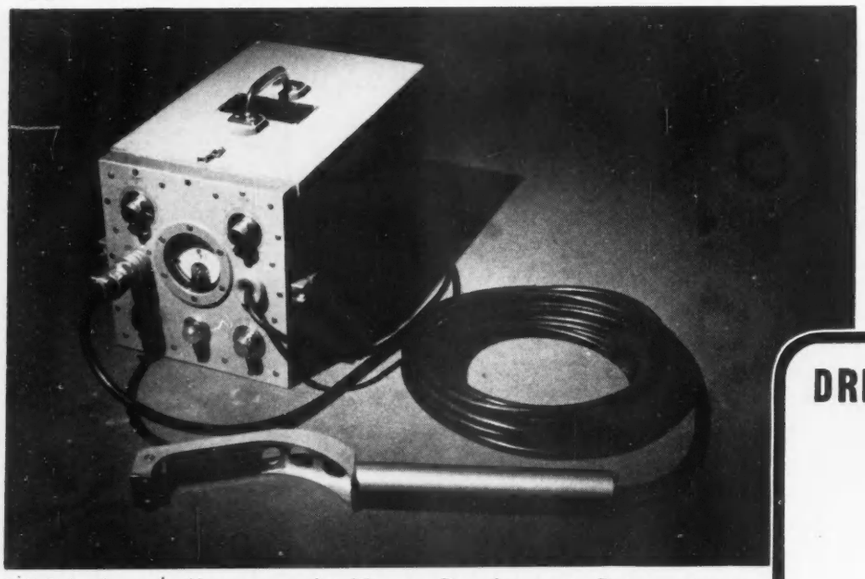
Manufactured by ELI to Serve the Petroleum Industry



E L I Petroleum Reservoir Evaluation Instruments include: Subsurface maximum and recording thermometers and pressure gauges, samplers and * related laboratory equipment.

This equipment was created to meet specific field requirements and the designs are the result of years of research and actual field operation. Manufactured to precision tolerances, the instruments are basically simple in operation, positive in action, non-corrosive and extremely accurate.

* Related laboratory equipment for the extensive study of reservoir conditions is designed for accuracy and simplicity of operation. This equipment includes: Pressure-Volume Cells, Mercury Pumps, Water Bath Assemblies, Viscosimeters, Coring Equipment, Water Determination Apparatus and others.



E L I is the sole licensee under Texaco Development Corp. patents, to manufacture the PENETRON an instrument that quickly and accurately measures wall thicknesses of high pressure lines or vessels. Measurements can be taken with the PENETRON from the inside, the outside or tangent to the surface, therefore, allowing inspection without unit shut-down. Eliminates premature retirement of materials, inspects without mutilation, and assures accuracy within 5%.

DRILLING SUPPLIES

PUMPS
KELLYS
SWIVELS
DRILL BITS
DRILL PIPE
PRESSURE HOSE
HOISTING PLUGS

Engineering Laboratories, Inc.

PLANTS AT TULSA AND DALLAS

Main Office: 602-624 East Fourth Street, Tulsa 3, Oklahoma, U. S. A.

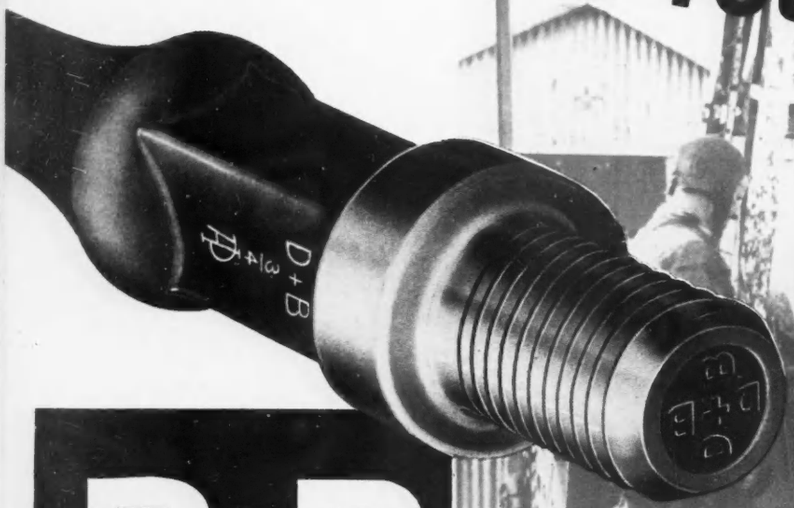
World Crude Oil Production, by Countries, by Years — (Continued)

(Complete production history of world, in thousands of barrels of 42 U. S. Gallons. *Sources: Mineral Resources and Minerals Yearbook*, except as otherwise indicated)

	ASIA																
YEAR	Bahrein Island	[A]Burma	India, British	Iran (Persia)	Iraq	Japan (Incl. Taiwan)	Netherland India	Sakhalin	Br. Borneo (Sarawak & Brunei)	Saudi Arabia	China	[C]Total Asia	Australia-New Zeal.	Rest of World	World Total	Percent Pro. by U.S.
1857															2	
1858															4	
1859															6	31
1860															509	98
1861															2,131	99
1862															3,092	99
1863															2,763	94
1864															2,304	92
1865															2,716	92
1866															3,899	92
1867															3,709	90
1868															3,990	91
1869															4,696	90
1870															5,799	91
1871															5,730	91
1872															6,877	92
1873															10,838	91
1874															11,933	92
1875						5						5			9,977	88
1876						7						7			11,051	83
1877						10						10			15,754	85
1878						18						18			18,417	84
1879						23						23			23,601	84
1880						26						26			30,018	88
1881						17						17			31,993	86
1882						15						15			35,704	85
1883						20						20			30,255	78
1884						28						28			35,969	67
1885						30						30			36,765	59
1886						38						38			47,243	59
1887						29						29			47,807	59
1888						37						37			52,165	53
1889			94			53						147			61,507	57
1890			118			52						170			76,633	60
1891			190			53						243			91,100	60
1892			242			69						311			88,739	57
1893			299			106	600					1,005			92,038	53
1894			327			173	688					1,188			89,337	55
1895			372			170	1,216					1,758			103,692	51
1896			430			237	1,427					2,094			114,199	53
1897			546			262	2,552					3,360			121,993	50
1898			542			319	2,964					3,825			124,979	44
1899			941			539	1,796					3,276			131,147	44
1900			1,079			871	2,253					4,203			149,137	43
1901			1,431			1,117	4,014					6,562		20	167,440	41
1902			1,617			996	2,430					5,043		26	181,809	49
1903			2,510			1,209	5,770					9,489		36	194,879	52
1904			3,385			1,219	6,508					11,112		40	217,948	54
1905			4,137			1,347	7,850					13,334		30	215,091	63
1906			4,016			1,564	8,181					13,761		30	213,263	59
1907			4,344			1,718	9,983					16,045		30	263,957	63
1908			5,047			1,871	10,283					17,201		30	285,287	63
1909			6,677			1,887	11,042					19,606		20	298,709	61
1910			6,138			1,829	11,031					18,998		20	327,763	64
1911			6,451			1,737	12,173					20,361		20	344,361	64
1912			7,117			1,659	10,846					19,622		20	352,443	63
1913			7,930	1,857		1,940	11,172		141			23,040		20	385,345	64
1914			7,410	2,910		2,636	11,422		318			24,696		20	407,544	65
1915			8,202	3,616		2,928	11,920		392			27,058		10	432,033	65
1916			8,491	4,477		2,963	12,517		629			29,107		25	457,500	66
1917			8,079	7,147		2,861	13,180		542			31,809		29	502,891	67
1918			8,188	8,623		2,441	12,778		504			32,534		25	503,515	71
1919			8,736	10,139		2,228	15,508		596			37,217		20	555,875	68
1920			8,375	12,230		2,221	17,529		1,020			41,375		20	688,884	64
1921			8,734	16,673		2,233	16,958	2	1,411			46,011		20	766,002	62
1922			8,529	22,247		2,055	17,066	7	2,849			52,753		22	858,898	65
1923			8,406	25,230		1,804	19,870	9	3,940			59,259		24	1,015,736	72
1924			8,416	32,373		1,814	20,473	80	4,163			67,319		24	1,014,318	70
1925			8,274	35,038		1,915	21,422	87	4,257			70,993		23	1,068,933	71
1926			8,011	35,812		1,785	21,243	181	4,942			72,004		17	1,096,823	70
1927			8,032	39,688	338	1,789	27,459	440	4,943			82,689		13	1,262,582	71
1928			8,741	43,461	713	1,944	32,118	677	[H]5,223			92,877		15	1,324,774	68
1929			8,747	42,145	798	2,023	39,279	[G]1,134	5,290			99,416		38	1,485,867	68
1930			8,292	45,828	913	1,950	41,729	[G]1,805	4,907			105,424		40	1,410,037	64
1931			8,200	44,376	830	2,050	35,539	2,734	3,854			97,583		54	1,372,532	62
1932			8,817	49,471	836	1,630	39,001	2,631	3,796			106,182		62	1,309,677	60
1933	31		8,713	54,392	917	1,455	42,606	2,338	4,490			114,972		71	1,442,146	63
1934	285		10,503	57,851	7,689	1,834	46,925	2,881	5,140			133,108		96	1,522,281	60
1935	1,265	7,181	2,038	57,273	27,408	2,249	47,171	2,545	5,546			152,676	5	4	1,654,488	60
1936	4,645	7,588	1,978	62,718	30,406	2,440	50,025	3,212	5,209	20		168,241	5	4	1,791,540	61
1937	7,762	7,848	2,162	77,804	31,836	2,488	56,724	3,656	6,009	65		196,354	4	4	2,039,231	63
1938	8,298	7,538	2,488	78,372	32,643	2,511	57,318	[E]3,821	6,913	495		200,397	4	4	1,988,041	61
1939	7,589	7,873	2,327	78,151	30,791	2,654	62,087	4,000	7,097	3,934	4	205,507	3	4	2,086,160	60.6
1940	7,074	7,731	2,302	66,221	24,225	2,639	62,011	4,000	7,047	5,365	10	188,625	3	14	2,144,050	63.1
1941	6,794	7,762	2,899	50,722	12,650	2,659	53,704	4,000	6,864	5,871	86	154,011	3	14	2,221,230	63.1
1942	[K]7,123	2,500	2,792	73,350	19,726	3,000	9,000	4,000	3,000	[K]5,118	340	129,949	3	15	2,081,429	66.6
1943	[K]6,572	1,000	2,279	[K]73,766	24,848	3,500	20,000	5,000	4,500	[K]4,868	447	146,780	5	15	2,233,549	67.4
1944	[K]6,714	750	2,500	[K]104,985	[K]27,958	3,000	40,000	5,000	6,000	7,794	505	205,206	5	14	2,617,071	64.1
1945[J]	7,309	750	2,500	140,525	31,845	2,500	30,000	5,000	5,000	21,311	500	247,240	5	15	2,783,021	61.5
Total	71,461	328,692		1,459,501	307,370	97,509	1,129,391	59,240	126,532	54,841	1,892	3,636,429	45	1,117	49,329,171	63.8

[A] Separation of Burma and India prior to 1935 not available from U. S. Bureau of Mines data here used. Data by L. Dudley Stamp in "Petroleum Development and Technology, 1933," and in A.I.M.E. "Transactions" indicate cumulatives through 1934 as follows, Burma 184,528, India 20,756. [B] Includes fields in Russian Asia other than Sakhalin. [C] Exclusive of U.S.S.R. fields in Asia, other than Sakhalin, which are included with U.S.S.R. in Europe. [D] Less than 1000 barrels. [E] Approximate production. [F] No more data available. [G] Year Ended September 30. [H] Beginning of production in Brunei. [I] France's earlier production credited to Germany. [J] 1945 estimated by the Oil Weekly. [K] Bureau of Mines combination figure distributed by estimate of The Oil Weekly.

FOR FAITH IN YOUR ROD STRING



D+B SUCKER RODS

REG. U.S. PAT. OFF.

D+B SUCKER ROD COUPLINGS

The faces of every D+B Sucker Rod Coupling are ground square with the axis of the threads and are lapped to a perfect smoothness to provide a straight, true, well shouldered joint. Case hardening is correct depth for maximum surface hardness without loss of strength. Threads are smooth and polished to assure ease and speed in making up the rod string.

All D+B Sucker Rods combine the best materials and precision workmanship with the most rigid standards of inspection.

Strength—ductility—high resistance to shock and corrosion fatigue—toughness — uniformity — balance — master craftsmanship — all are D+B built-in features of vital importance to efficient pumping service.

D+B Sucker Rods used with D+B Couplings . . . a complete D+B String . . . means more efficient and economical pumping.

D+B RELIANCE—A special nickel copper alloy steel. Recommended for heavy pumping duty in severely corrosive wells.

D+B TYPE "5"—A nickel molybdenum alloy steel. Recommended for heavy pumping duty in medium corrosive wells.

D+B HEATREAT—A carefully selected medium carbon steel. Recommended for medium and heavy pumping duty where corrosion is not a great problem.

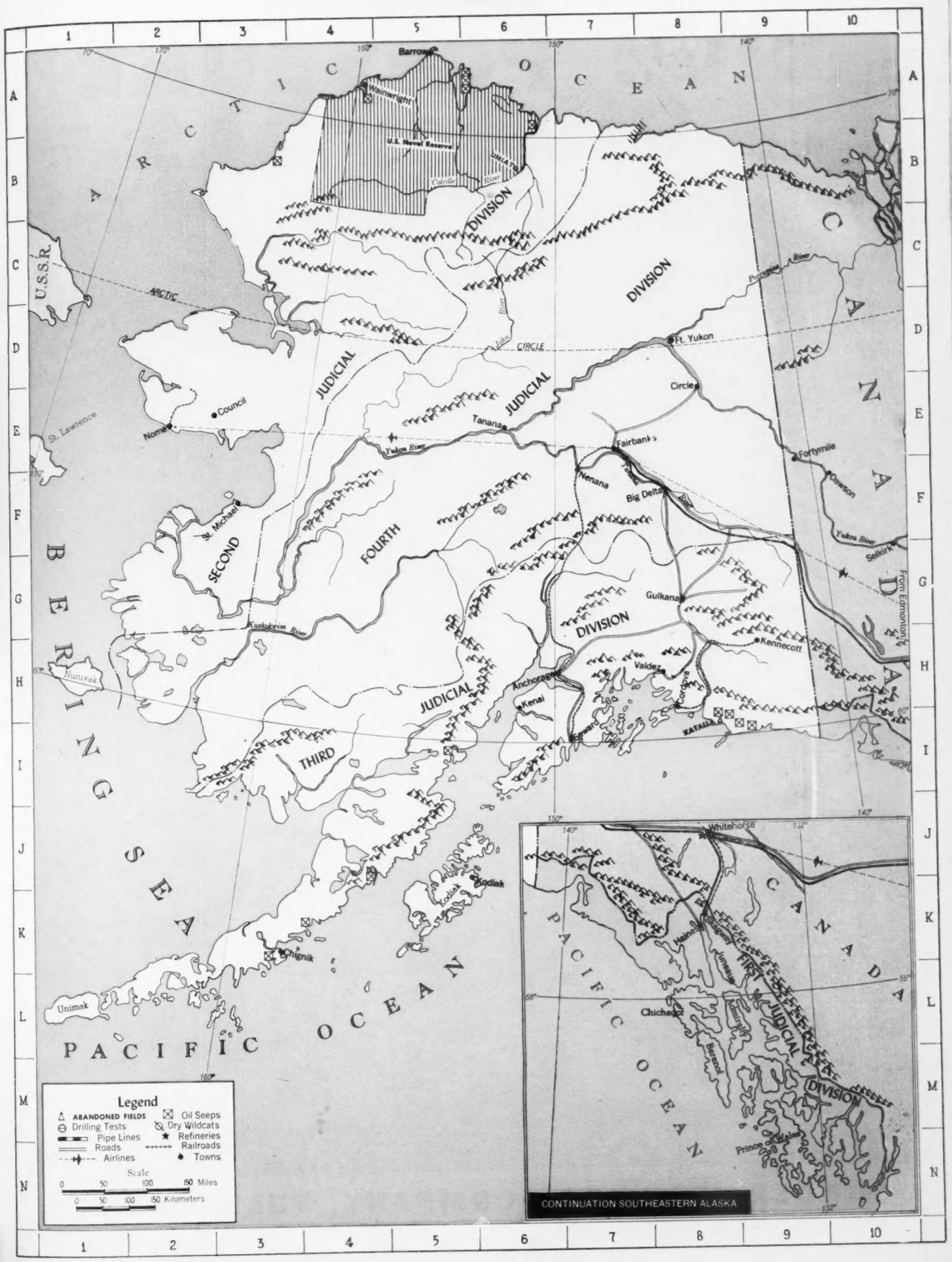
D+B GRADE "A"—A normalized medium carbon steel. Recommended for light to medium pumping duty in non-corrosive fluids.

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

THE CONTINENTAL SUPPLY COMPANY, *General Offices:* DALLAS, TEXAS • EXPORT DIVISION: *30 Rockefeller Plaza,* NEW YORK, N. Y.
Representatives: ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ENGLAND • JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA

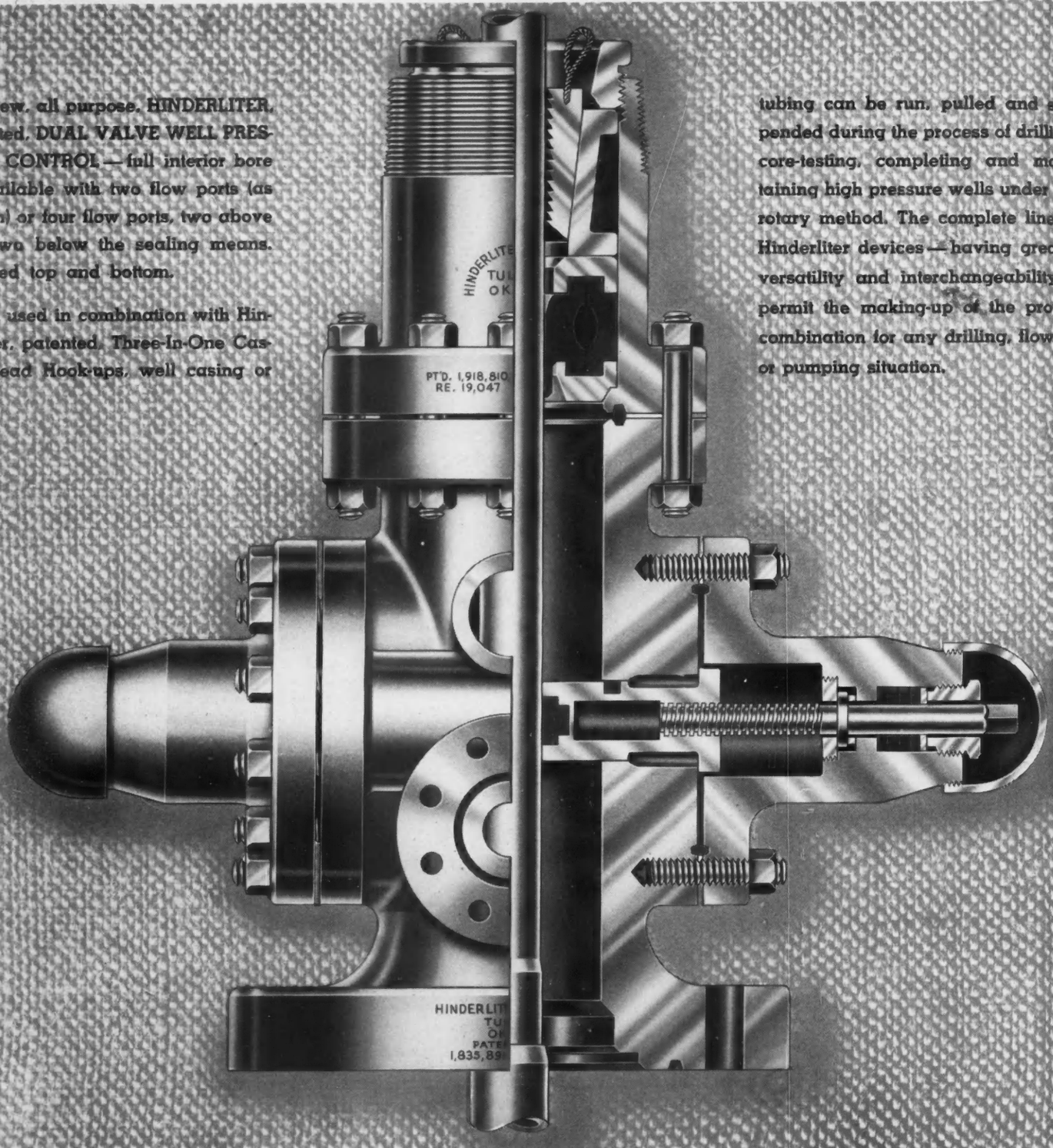
ALASKA


ARCTIC OCEAN
BERING SEA
PACIFIC OCEAN
CANADA
U.S.S.R.
Barrow
Wainwright
U.S. Naval Reserve
UMIAT
Colville River
DIVISION
ARCTIC CIRCLE
Yukon River
Porcupine River
Ft. Yukon
Circle
Fairbanks
Tanana
Nenana
Big Delta
Fortymile
Dawson
Yukon River
Selkirk
From Edmonton
Gulkana
Kennecott
Valdez
Anchorage
Kenai
Seward
Cordova
Kuskokwim River
Nunivak
St. Michael
Nome
Council
St. Lawrence
Unimak
Chignik
Kodiak
Afognak
JUDICIAL
FIRST
SECOND
THIRD
FOURTH
Whitehorse
Haines
Juneau
Skagway
Chichagof
Petersburg
Wrangell
Prince Rupert
CONTINUATION SOUTHEASTERN ALASKA
Legend
ABANDONED FIELDS
Drilling Tests
Pipe Lines
Roads
Airlines
Oil Seeps
Dry Wildcats
Refineries
Railroads
Towns
Scale
0 50 100 150 Miles
0 50 100 150 Kilometers

WELL HEAD DEVICES for HIGH PRESSURE ...OIL and GAS

The new, all purpose, HINDERLITER, patented, DUAL VALVE WELL PRESSURE CONTROL — full interior bore — available with two flow ports (as shown) or four flow ports, two above and two below the sealing means. Flanged top and bottom.

When used in combination with Hinderliter, patented, Three-In-One Casing Head Hook-ups, well casing or tubing can be run, pulled and suspended during the process of drilling, core-testing, completing and maintaining high pressure wells under the rotary method. The complete line of Hinderliter devices — having greater versatility and interchangeability — permit the making-up of the proper combination for any drilling, flowing or pumping situation.



HINDERLITER TOOL COMPANY, TULSA, OKLA.

Division of

H. K. PORTER COMPANY, Inc.

ALASKA

HISTORY AND PROSPECTS

THERE are three areas in Alaska where prospecting for oil has been carried on:

1. The Katalla-Yakatage district (H and I-9 on map, page 39), on the Gulf of Alaska, in the southeastern part of the country, about 25 miles east of Cordova.

2. The Alaska Peninsula, in the Iniskin-Chinitna district. (J and K-4 on map.)

3. United States Naval Petroleum Reserve No. 4 (A and B-4, 5 and 6), northwestern Alaska, comprising about 35,000 square miles in the Point Barrow area, on the extreme northwestern coast, beyond the Arctic Circle.

In the *Katalla-Yakatage area,* Chilkat Oil Company developed a small field and operated several 1000-foot producing wells for more than 20 years. A small refinery supplied gasoline to the fishing fleet at Cordova, and fuel to other consumers. This continued until 1933 when the project was abandoned as unprofitable. Production was measured in terms of a few thousand barrels of light gravity, paraffin base oil, a year. The gross value of the output over the entire life of the field was less than $750,000.

In the *Iniskin-Chinitna district,* on the Alaska Peninsula, approximately 150 miles west of Kodiak Island, two deep tests and several shallow ones have been drilled. In the deep holes encouraging shows of oil and gas were found, but both failed to make commercial production. The deepest of the two, drilled by Iniskin Drilling Company, of Los Angeles, headed by R. E. Havenstrite and Carl Beal, reached 8800 feet and is Alaska's deepest test. Work was abandoned just before the war, but it is possible that further exploration may be continued at the location this year.

Standard of California and associates also drilled a test in this general area, on the Bear Creek-Salmon Creek structure, 5 miles from Jute Bay, to 7500 feet. This project was also abandoned before the war.

U. S. NAVY PLANS

On *Naval Petroleum Reserve Number 4,* Umiat 1 will resume drilling this spring. The test was shut down in September of last year, at 1816 feet, after encountering five separate oil showings, none of which were of commercial importance. Exploration was being carried on by the United States Navy with the Seabees. A permanent camp was built at Point Barrow and at Umiat. The work has now been turned over to civilian contractors who will complete the present well, fully explore the remainder of the reserve, and drill other tests, probably seven in all. Operations were to be resumed as soon as the spring season opens.

Umiat 1 is located in the southeastern part of the reserve, about 183 miles from Point Barrow. The next test will probably be drilled in the Cape Simpson District, about 60 miles east of Point Barrow. Exploration on the reserve will not be completed until about 1950, and will involve a cost of $10 or 11 million.

The firm of Hoover, Curtis & Ruby, general contractors of New York City, have charge of the work. This concern has awarded sub-contracts to Lytel & Green, of Des Moines, Iowa, and to United Geophysical Company, Pasadena, Calif.

Petroleum Reserve No. 4 embraces between 35,000 and 40,000 square miles including most of the country from the crest of the Brooks Range northward to the Arctic Ocean and from the Colville River on the east to near the meridian of 162 West longitude on the west.

The present program of the United States Navy involves exploration only.

SURVEYS MADE

In each of the areas mentioned there are unusual oil seeps and structures believed to be favorable to the accumulation of petroleum. The United States Geological Survey has done considerable reconnaissance work in Alaska and has issued several reports on various surveys. However, a very small percentage of the total area of the territory has been studied. Much work remains to be done before the surveys are completed. A number of features lend encouragement to the belief held by many geologists that important reserves of oil exist in Alaska.

Conclusions from a geological reconnaissance survey made by the Navy, under supervision of William T. Foran, Lieutenant Commander, in 1944, were that "The region comprising Naval Petroleum Reserve No. 4 in northwest Alaska, has all the geologic qualifications demanded of a potential oil setting. With its enormous volume of marine sediments, its numerous and conspicuous oil and gas seepages, and remarkable regular structural alignment, it may be legitimately considered the most attractive looking, yet untested petroliferous area in the Western Hemisphere."

Alaska is a territory and all the land not privately owned belongs to the United States. Climate, terrain, and the remoteness of the country, add to the difficulties of prospecting. Distances and the cost of transportation will make it extremely difficult for oil discovered in Alaska to compete with production in the United States. However, a nearby source of petroleum would be a decided advantage to the future development of the territory.

TRANSPORTATION

Transportation to and from and in Alaska is of four main types: ocean and river steamers, railroad, airplane and motor. Good harbors along the Pacific seaboard of the territory are connected by railroad or automobile road with inland areas. As far west as Kodiak, the entire length of the Alaska peninsula and Bristol bay, these ports are open throughout the year, although during the winter months scheduled sailings from Seattle are maintained only as far as Kodiak.

On December 1, 1944, there were 26 licensed air carriers operating in Alaska and from continental United States to Alaska. Daily service is maintained by Pan American World Airways between Seattle and Fairbanks, three weekly round-trips are made by the same company between Fairbanks and Nome, and once weekly between Fairbanks and Bethel. Regular service is maintained between Juneau and Anchorage, and between Anchorage and Seward. Alaska Coastal Airlines with headquarters at Juneau operates a fleet of planes between Southeastern Alaska points and from Fairbanks regular schedules are maintained between that city and Nome and other Seward Peninsula towns. Flights can be arranged from Fairbanks to Point Barrow.

It is possible that the Alcan highway can be used to transport materials and equipment for use on Reserve No. 4 in the near future. Canada assumed responsibility for this highway on April 1, and prospects for civilian use of that famous road have brightened considerably.

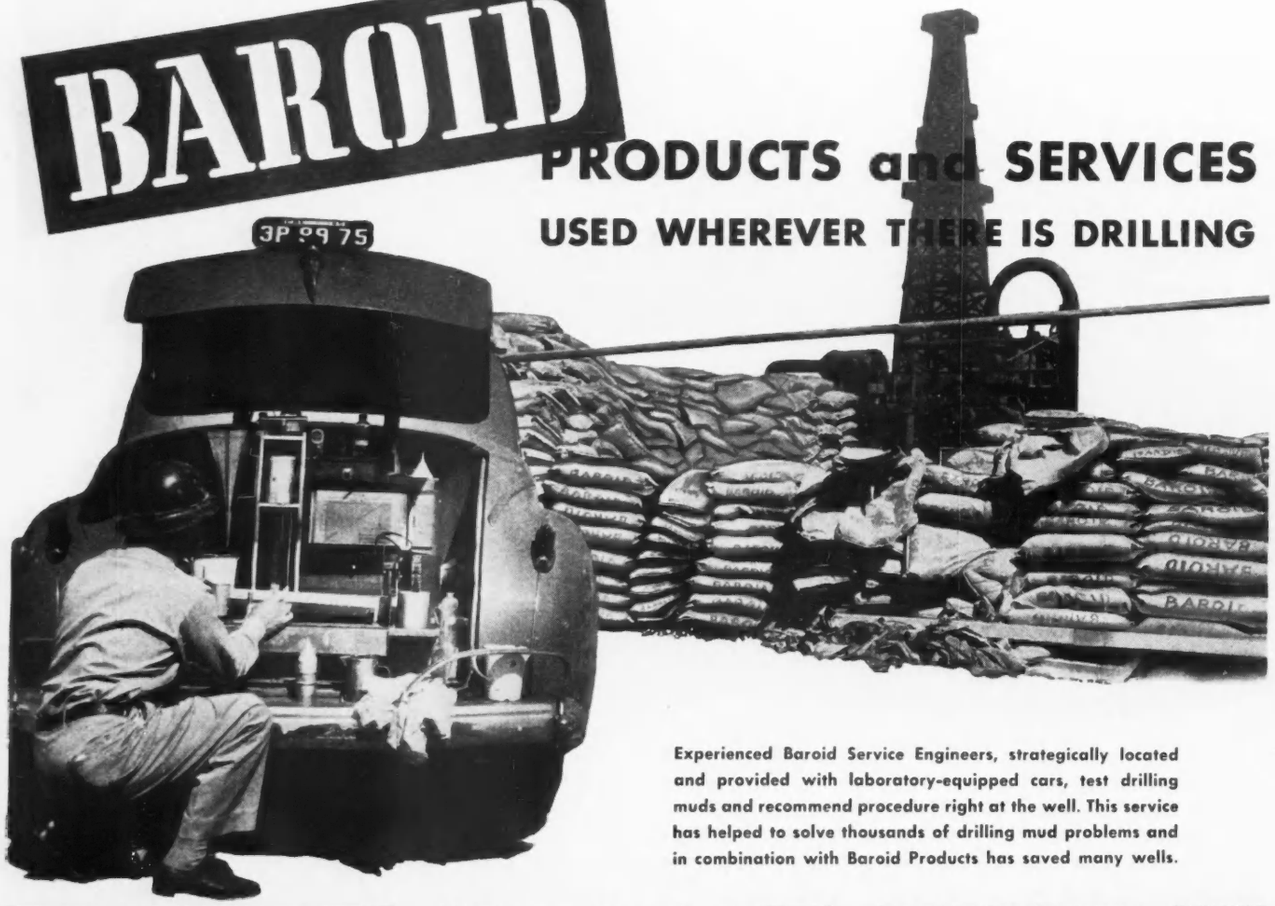
At present civilian accommodations are adequate only as far as Fort Saint John, in the northeast corner of British Columbia. North of that vilage, civilians are permitted to travel only if they have business reasons, and they must provide their own comfort facilities.

The highway is 1523 miles long and links Edmonton, Canada, with Fairbanks, Alaska. When opened to general traffic, the road will make possible motor travel from the United States to Alaska.

BAROID

PRODUCTS and SERVICES

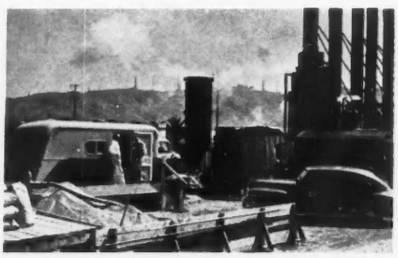
USED WHEREVER THERE IS DRILLING



Experienced Baroid Service Engineers, strategically located and provided with laboratory-equipped cars, test drilling muds and recommend procedure right at the well. This service has helped to solve thousands of drilling mud problems and in combination with Baroid Products has saved many wells.

Barytes and bentonite used in Baroid Products are obtained from Baroid Sales Division's own mines and processed in Baroid Sales Division's own plants. These mines and mills are the largest and best equipped in the industry.

The industry's most modern laboratories maintain and improve the quality of Baroid Products. These laboratories at Los Angeles, Tulsa and Houston also develop new materials, new applications and new processes for the prevention of drilling troubles.



Baroid Well Logging Service provides formation information through mud analysis. It is a successful method of determining the presence or absence of oil or gas in various formations and of logging the depths and approximate thicknesses thereof. Minimizes coring in many fields.

BAROID PRODUCTS

ANHYDROX • AQUAGEL • AQUAGEL
CEMENT • BAROCO • BAROID • FIBERTEX
IMPERMEX • MICATEX • SMENTOX
STABILITE • ZEOGEL • TESTING EQUIPMENT
BAROID WELL LOGGING SERVICE.

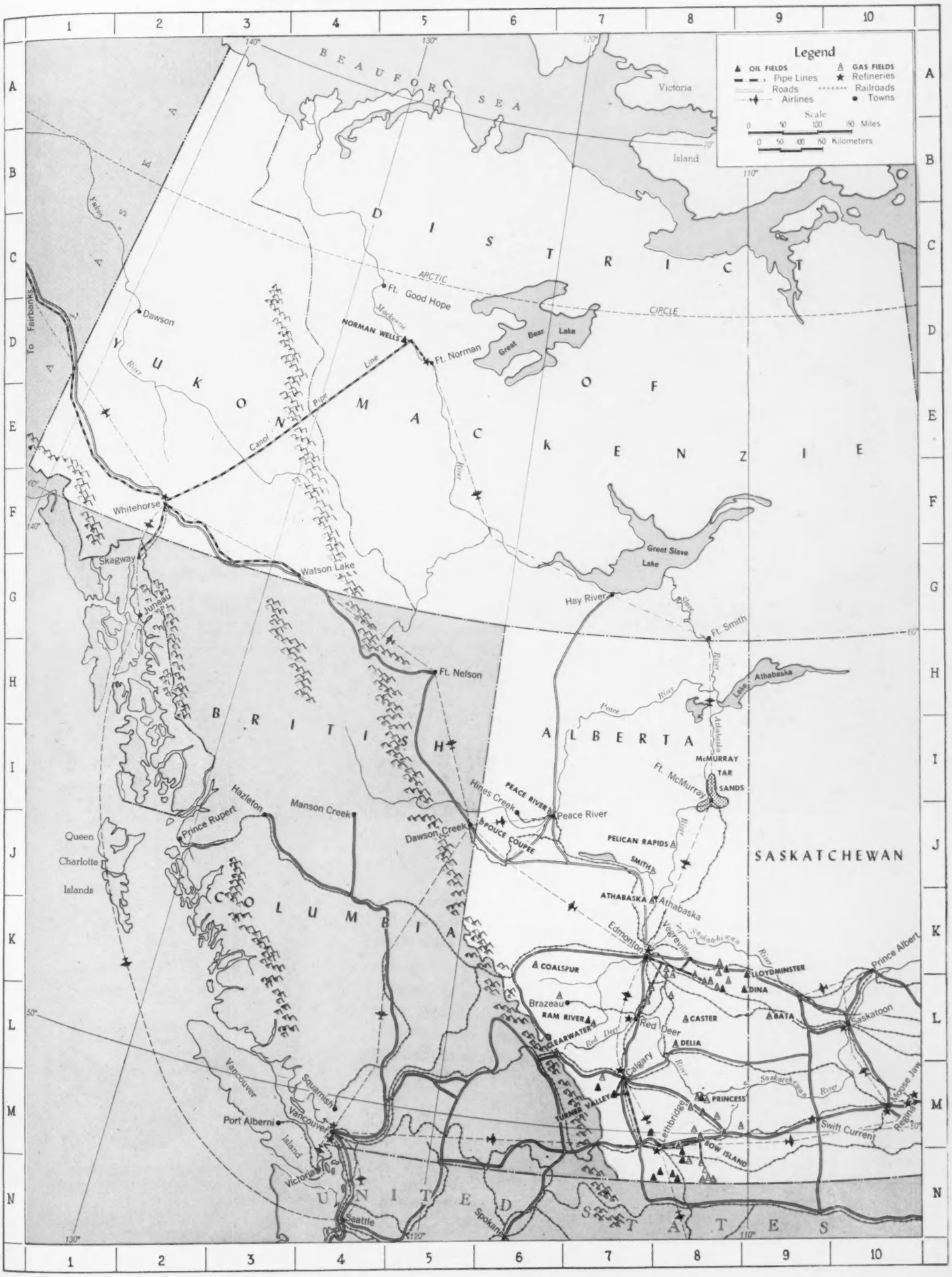
PATENT LICENSES unrestricted as to sources of supply of materials, but on royalty bases, will be granted to responsible oil companies and others desiring to practice the subject matter of any and/or all of United States Patents Numbers 1,807,082; 1,991,637; 2,041,086; 2,044,758; 2,064,936; 2,094,316; 2,119,829; 2,214,366; 2,294,877; 2,304,256; 2,387,694; 2,393,165 and further improvements thereof. Applications for Licenses should be made to the Los Angeles office.

Since 1926, Baroid Products and Services have made many valuable contributions to faster, safer, more economical drilling. Operators who use Baroid Sales Division's complete mud service find that many drilling difficulties are eliminated in deep or shallow wells.

Stocks of Baroid Products are immediately available in more than 450 locations in the United States and Canada. Always use Baroid Products and Services to get the BEST in mud control.

Baroid Sales Division
NATIONAL LEAD COMPANY
LOS ANGELES 12 • TULSA 3 • HOUSTON 2

CANADA—Western Area



—"Insular America," by Bellin, 1762.

The Gulf of Mexico...the Spanish Main ...Still a Challenge to Explorers!

Early explorers sailed uncharted seas... probed unknown, unfriendly lands in their quest for new territories. By 1762 their efforts had enabled cartographers to draw maps like that by Bellin.

Since 1930 many GSI crews have crossed the blue waters of the Gulf and the Caribbean to make seismic surveys in search of oil. And the "black gold" withdrawn from the areas they worked has been a far richer treasure than any dreamed of by the conquistadors who trod those lands centuries before.

GSI

GEOPHYSICAL SERVICE INC.

DALLAS, TEXAS

CANADA—Western Area

CURRENT PERIOD ACTIVE

WESTERN Canada, where most of Canada's oil is produced, experienced wide-spread development during the 1944-45 period which is continuing through 1946. At present, in excess of 10 million acres of oil and gas rights are held under lease of reservation in Alberta alone, the bulk under commitments requiring geological, geophysical and/or drilling in 1946.

One hundred twenty-four wells were completed in Alberta during 1945, down 16 from the 140 completions for 1944. Primarily responsible for the drop was Turner Valley, where completions slumped to 17 compared with 42 in 1944. Of the 124 completions in 1945, 46 obtained oil production, 16 were gas wells, 5 were still on test at year's end, and 57 were abandoned.

The Southern Alberta Plains region received a bulk of the wildcat drilling during the past two years. In 1944, of the 41 wildcat tests drilled, 8 were completed either to open new fields or extend proven pools. In 1945, eight discoveries were made out of 38 tests drilled.

Wildcat drilling was boosted considerable during 1945 in the Alberta Foothills but out of the 8 wildcat tests drilled no discoveries were chalked up. Three wildcats in 1944 yielded one discovery.

Three discoveries and four dry holes was the record in 1945 for the Central Alberta Plains. This compared with two strikes and four dry holes in 1944. One of the 1945 strikes

Producing Oil Wells and Crude Oil Production in Western Canada

FIELD, PROVINCE	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)			
		Shut In	Producing: Flowing	Producing: Art. Lift	Producing: Total Producing	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
Turner Valley District, Alberta:									
Limestone (Oilwells)	1936	16	265	....	265	17,599			
Limestone (Distillate)	1924	5	17	....	17	76	7,878,128	7,009,521	75,701,491
Shallow Oilwells	1914	1	....	2	2	8			
Vermilion, Alberta	1939	6	....	47	47	569	234,603	238,358	656,108
Taber, Alberta	1937	3	....	11	11	321	148,638	135,000	427,210
Wainwright, Alberta	1922	....	....	7	7	50	17,154	16,472	223,025
Conrad, Alberta	1944	....	....	17	17	517	24,733	143,696	168,429
Armelgra, Alberta	1943	1	....	....	....	....	....	....	462
Dina Ribstone, Alberta	1929	4	....	....	....	....	....	....	37,352
Del Bonita-Twin River, Alberta	1939	3	....	2	2	5	9,366	4,091	30,861
Jumping Pound, Alberta	1944	....	1	....	1	1	....	3,471	3,471
Lloydminster, Alberta	1940	5	....	9	9	115	6,296	28,321	40,146
Moose Dome, Alberta	1937	2	....	....	....	....	628	....	8,977
Princess-Steveville, Alberta	1940	1	7	1	8	208	13,815	63,377	108,112
Tilley, Alberta	1942	1	....	....	....	....	3,137	593	14,513
Lloydminster, Saskatchewan	1945	....	....	6	6	330	....	15,857	15,857
Norman Wells, Northwest Territories	1920	....	....	....	[1]	140	1,229,310	[2]344,774	[3]2,042,185

[1] 64 oil wells completed. Number producing end of 1945 not known. [2] First eleven months. [3] To November 30, 1945.

Engineering and Geological Data on Western Canada Oil Fields

FIELD PROVINCE**	Location on Map Page 47	Proved Area Acres	Range of Gravity of Oil API	PRODUCING FORMATION: Name	Kind	Age	DEPTH OF WELLS (Ft.): Min. to Top of Pay	Max. Total Depth	Average Thickness of Pay Feet	Type Structure
§Arme.gra	K-8	?	18	Ellis	Sand	Jurassic	3,100	?	.....	Unknown.
§Athabaska*	A-5	25,000	.....	Labiche	Sand	Up. Cret.	600	1,300	?	Strat. trap.
§Barnwell*	L-7	5,000	.....	Bow Island	Sand	Up. Cret.	2,150	.....	10	Monocline.
Bow Island*	L-8	10,700	.....	Bow Island	Sand	Up. Cret.	1,900	2,255	9	Dome.
Brooks*	J-7	2,500	.....	Milk River	ss. sh.	Up. Cret.	1,190	1,250	100	Strat. trap.
Conrad	M-7	1,000	25-26	Ellis	Sand	Jurassic	2,960	3,125	13	Strat. trap.
Del Bonita	N-6	200	36-38	Madison	Lime	Miss.	5,054	.....	12	Anticline.
§Dina	E-10	400	14-15	Meridian	Sand	Low. Cret.	1,680	1,900	15	Strat. trap.
Fabyan*	E-8	200	.....	1. Viking	Sand	Up. Cret.	1,585	1,750	27	Strat. trap.
				2. Lower	Sand	Low. Cret.	1,750	1,900	10	
Foremost*	M-8	5,000	.....	Bow Island	Sand	Up. Cret.	2,050	2,250	9	Anticline
§Keho Dome	L-6	?	29-32	Bow Island	Sand	Up. Cret.	3,680	.....	5	Anticline.
Kinsella*	D-8	25,000	.....	Viking	Sand	Up. Cret.	2,100	2,200	10	Strat. trap.
Hay Lake	N-7	100	29-30	Madison	Lime	Miss.	3,094	.....	4	Dome.
Jumping Pound†	I-4	?	46-53	Madison	Lime	Miss.	9,900	.....	300	Anticline.
Lloydminster	D-10	7,000	14	Skarky	Sand	Low. Cret.	1,750	2,000	10	Anticline.
Medicine Hat*	K, L-9	40,000	.....	Medic. Hat	Sand	Up. Cret.	900	1,250	20	Strat. trap.
§Moose Dome†	J-8	200	47.7	Fairholme	Lime	Devonian	1,534	.....	?	Dome.
Princess†	J-8	200	34.5	Devonian	Dolo.	Devonian	3,980	4,000	18	Dome.
Princess†	J-8	200	26-28	Sunburst	Sand	Low. Cret.	3,177	.....	35	Strat. trap.
Princess†	J-8	200	26-29	Madison	Lime	Miss.	3,300	3,320	5	Strat. trap.
§Red Coulee	N-7	150	31.5	Vanalta	Sand	Low. Cret.	2,417	2,475	30	Terrace.
§Skiff		?	18-23	Ellis	Sand	Jurassic	3,054	3,080	?	Unknown.
Suffield*	K-9	2,000	.....	Medic. Hat.	Sand	Up. Cret.	980	1,130	40	Strat. trap.
Taber, East	L-7	260	17-20	Taber	Sand	Low. Cret.	3,082	3,218	25	Strat. trap.
Taber, West	L-7	350	21-23	Taber	Sand	Low. Cret.	3,230	3,260	21	Strat. trap.
§Tilley	K-8	?	27	Sunburst	Sand	Low. Cret.	3,170	.....	10	Strat. trap.
Turner Valley†	J-4	25,000	37-64	Madison	Lime	Miss.	3,400	9,600	450	Anticline.
Twin River	N-7	?	36.6	Madison	Lime	Miss.	3,913	3,946	?	Anticline.
Vermilion	D-9	1,000	13-14	Vermilion	Sand	Low. Cret.	1,870	1,980	5	Strat. trap.
Viking*	D-8	25,000	.....	Viking	Sand	Up. Cret.	2,100	2,225	20	Strat. trap.
Wainwright	E-9	12,000	18-22	Wainwright	Sand	Low. Cret.	2,200	2,300	10	Anticline.

** All fields listed are in Alberta. Symbol (§) indicates that field was not produced during the year 1945. * Gas field. † Oil and gas. All others oil only.

Dedicated To The Proposition Of Safety

When used as the sole drilling control unit, O-C-T Blowout Preventers can be relied upon to effect a pressure-tight seal around pipe in the hole. As an auxiliary control unit above ram type blowout preventers they provide a dependable secondary seal and relieve the ram packers of wear while pipe is worked to prevent sticking. Stripper type packoffs are interchangeable with the regular type packoff to permit running tubing and casing under pressure. Complete mechanical details are carried in the Composite Catalog of Oilfield and Pipeline Equipment, or descriptive literature will be sent on request.

OIL CENTER TOOL COMPANY

HOUSTON, TEXAS

EXPORT: VAL R. WITTICH, 30 ROCKEFELLER PLAZA, NEW YORK CITY, U. S. A.

CANADA—Alberta Fields

'S A Wilson

ONGS provide a range
sing Tong Head will
ent WEB WILSON

are

CANADA—Western (Continued)

included the extension of the Lloydminster field into Saskatchewan.

At present, there are 64 producing wells in the Norman Wells field, Northwest Territory. Development has been curtailed since the United States government ended the Canol project. However, this region continues to receive some wildcat development and geophysical work.

1945 COMPLETIONS IN ALBERTA

Total completions in Alberta during 1945 showed a slight decrease with 124 wells finaled last year as compared with 140 during 1944.

The most active sector was South Alberta Plains where 81 completions were recorded in 1945. The completions included 26 oil wells, 13 gas wells and 42 dry holes.

In the Alberta Foothills sector 25 completions were marked up including 15 oil wells, all at Turner Valley, 9 dry holes and operations on one test were suspended.

Completions in Central Alberta Plains totaled 18 including 5 oil wells, 3 gas wells, 6 dry holes and 4 suspended operations.

Total completions included 46 oil wells, 16 gas wells, 57 dry holes and 5 tests suspended. During 1944, the completions included 71 oil wells, 7 gas wells, 54 dry holes, and 8 suspended operations.

Petroleum Production in Alberta—1940, 1944 and 1945 and Cumulative

SOURCE:	Year 1940	Year 1944	Year 1945	To 12-31-45 Cumulative
Turner Valley:				
Oil Production	8,180,325	7,878,128	7,009,521	75,701,491
Natural Gasoline	274,172	448,186	412,540	5,428,530
Total Turner Valley	8,454,497	8,326,314	7,422,061	81,130,021
Vermilion Oilfield	10,817	234,603	238,358	656,108
Taber Oilfieds	.....	148,638	135,000	427,210
Wainwright Oilfield	7,527	17,154	16,472	223,025
Conrad Oilfield	.....	24,733	143,696	168,429
Armelgra Area	.....	.....	.....	462
Dina Area	4,746	.....	.....	37,352
Del Bonita—Twin River Area	3,444	9,366	4,091	30,861
Jumping Pound Area	.....	.....	3,471	3,471
Keho Lake Area	.....	.....	.....	955
Lloydminster Oilfield	1,648	6,296	28,321	40,146
Moose Dome Area	351	628	.....	8,977
Princess-Steveville Area	.....	13,815	63,377	108,112
Ram River Area	.....	207	.....	207
Red Coulee Oilfield	12,177	3,835	.....	328,711
Skiff Area	.....	.....	.....	8,298
Tilley Area	.....	3,137	593	14,513
Total Other Fields	40,710	462,412	633,379	2,056,837
Total Alberta Production	8,495,207	8,788,726	8,055,440	83,186,858

Western Canadian Refineries

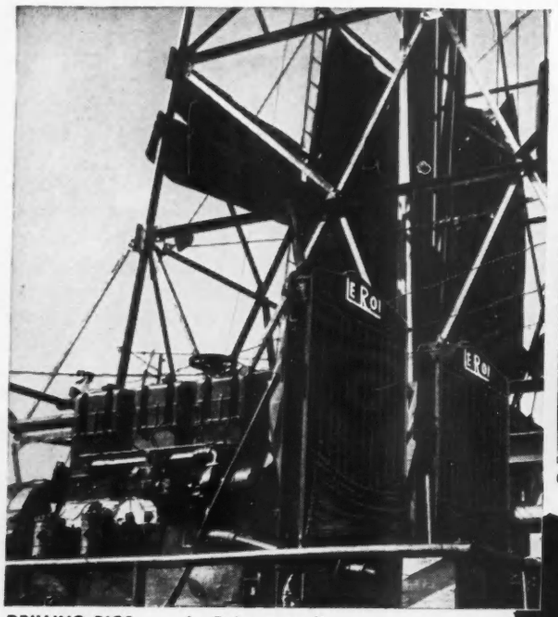
COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity, (Bbls. Daily)	Type of Refinery	Operating Status
Alberta:					
British-American Oil Co., Ltd.	Calgary	5,500	2,500	S-C-A	Operating
Gas & Oil Refineries, Ltd	Hartell	2,200	1,000	Skim-Crk	Operating
Imperial Oils, Ltd	Calgary	8,300	4,000	S-C-A	Operating
Pacific O&R of Alberta	.....	2,000	None	Skimming	Operating
Dina Oil & Refin. Co., Ltd	Dina	200	....	Skimming	Operating
Gold Standard Oils, Ltd.	Wainwright	300	....	Skimming	Operating
Lloydminster Refin., Ltd.	Lloyd-minster	100	....	Skimming	Operating
British Columbia:					
Home Oil Distributors, Ltd.	N. Van-couver	2,000	None	Skimming	Shut Down
Imperial Oils, Ltd	Ioco	16,000	2,600	Complete	Operating
Shell Oil Co. of B.C.	Shelburn	4,200	None	Skimming	Operating
Standard Oil Co. of B.C.	Burnaby	4,700	None	Skim-Asphalt	Operating
Manitoba:					
Anglo-Canadian Oils, Ltd.	Brandon	2,000	1,000	Skim-Crk	Operating
North Star Oil, Ltd.	St. Bona-face	2,000	750	S-C-A	Operating
Radio Oil Refining, Ltd.	Winnipeg	500	None	Skimming	Operating
Trump Oil Co., Ltd.	Morris	250	None	Skimming	Operating
Northwest Territory:					
Northwest Co., Ltd.	Ft. Norman	850	None	Skimming	Operating
Saskatchewan:					
British-American Oil Co., Ltd.	Moose Jaw	5,200	2,500	S-C-A	Operating
Consumers Co-op. Refin.	Regina	1,500	500	Skim-Crk	Operating
Imperial Oil, Ltd.	Regina	10,500	6,500	S-C-A	Operating
Sterling Refineries, Ltd.	Yorkton	750	250	Skimming	Shut Down
HiWay Refineries, Ltd.	Moose Jaw	300	....	Skimming	Operating
HiWay Refineries, Ltd.	Saskatoon	300	....	Skimming	Operating
HiWay Refineries, Ltd.	Rosetown	275	....	Skimming	Operating
Northern Petroleum Corp.	Kamsack	200	....	Skimming	Operating

Crude Oil Pipelines of Western Canada

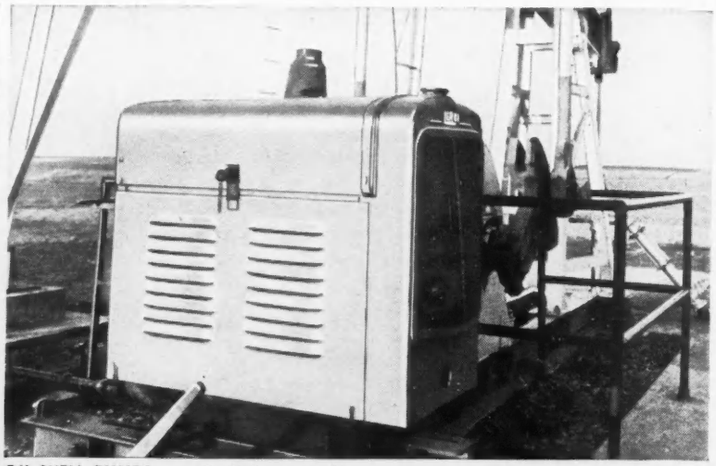
COMPANY	Origin	Terminus	Length: (Miles)	Diameter, (Inches)	Year Completed	Status
Valley Pipeline Company	Turner Valley	Calgary	30	4	1925	In use
Valley Pipeline Company	Turner Valley	Calgary	30	4	1937	In use
Valley Pipeline Company	Turner Valley	Calgary	31	6	1938	In use
Valley Pipeline Company	Turner Valley	(Gathering lines)	105	2, 3, 4	1945	In use
Standard Development Company	Conrad field	Conrad	5½	4	1945	In use
Standard Development Company	Princess field	Princess	3½	3	1945	In use

Natural Gas Pipelines of Western Canada

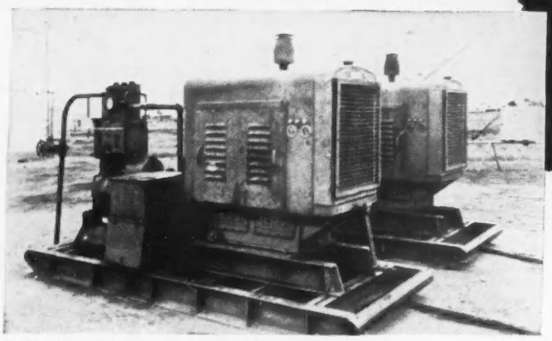
COMPANY	Origin	Terminus	Length: (Miles)	Diameter, (Inches)	Year Completed	Status
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	Calgary	28	10	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	De Winton	16	14	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Turner Valley	Okotoks	15	6	1922	In use
Canadian Western Natural Gas, Light, Heat & Power Company	Foremost	Bow Island	29.5	10	1912	In use
Canadian Western Natural Gas, Light, Heat & Power Comapny	Bow Island	Calgary	169.5	16	1912	In use
Canadian Western Natural Gas, Light, Heat & Power Company—(Branches on Bow Island, Calgary system, served from Turner Valley	.....	Lethbridge	4.1	8	1912	In use
	.....	MacLeod	16.6	6	1915	In use
	.....	Granum	5.5	6	1915	In use
	.....	Claresholm	9.9	6	1920	In use
	.....	Stavely	3.3	3	1915	In use
	.....	Nanton	1.4	4	1915	In use
Northwestern Utilities, Ltd	Viking	Edmonton	77.2	12¾ (Double)	1923	In use
Northwestern Utilities, Ltd	Kinsella	Viking	10	10 & 12	1940	In use
Northwestern Utilities, Ltd., (Branch on Viking-Edmonton system)	.....	Vegreville	20	4	1930	In use
	.....	Ponoka	70	8	1946	Building
	Ponoka	Red Deer	30	6	1946	Building
Franco Utilities, Ltd	Vermilion field	Vermilion	5	4	1943	In use
Wainwright Gas Company	Fabyan	Wainwright	7½	4	1927	In use



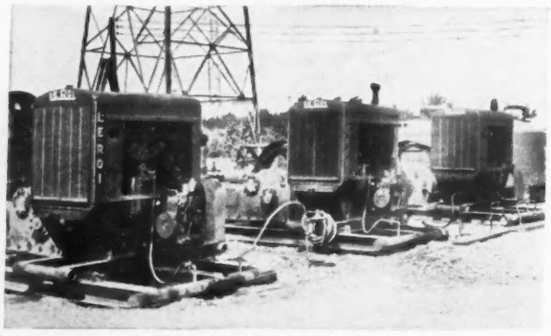
DRILLING RIGS . . . Le Roi-powered!



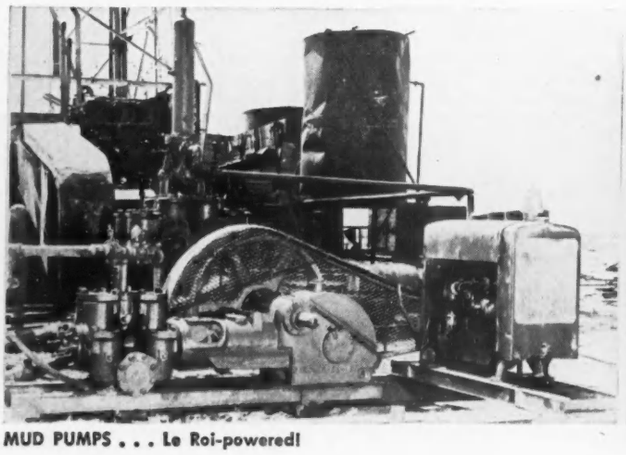
OIL WELL PUMPS . . . Le Roi-powered!



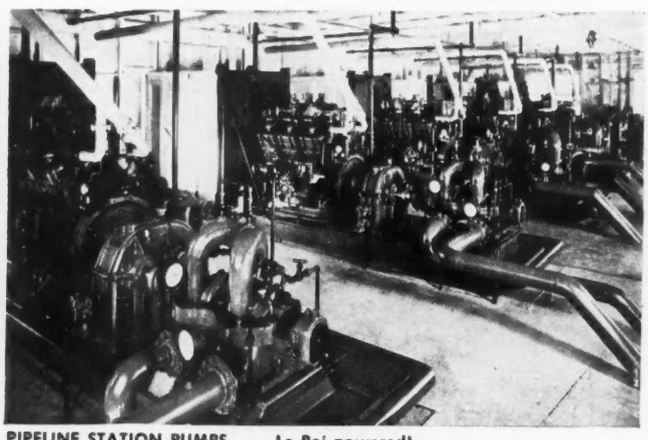
GATHERING PUMPS . . . Le Roi-powered!



SALT WATER DISPOSAL PUMPS . . . Le Roi-powered!



MUD PUMPS . . . Le Roi-powered!



PIPELINE STATION PUMPS . . . Le Roi-powered!

There's a *specialized*

Le Roi Engine

for every oilfield application

Sales and service facilities in every oil-producing area — assuring you of prompt, efficient handling of your requirements

LE ROI
MILWAUKEE

Oklahoma
Le Roi Company Branch—Tulsa
Carson Machine & Supply Company, Oklahoma City

East & South Texas Gulf Coast
Southern Engine & Pump Company, Houston, Kilgore, Edinburg, Dallas*, San Antonio*, and New Iberia, La.

North & West Texas — New Mexico
General Machine & Supply Company, Wichita Falls, Odessa, Lubbock*

Kansas
Carson Machine & Supply Company, Great Bend

Illinois — Missouri
Western Machinery Company, Centralia, St. Louis

Michigan
Hafer Engine Service — Reed City

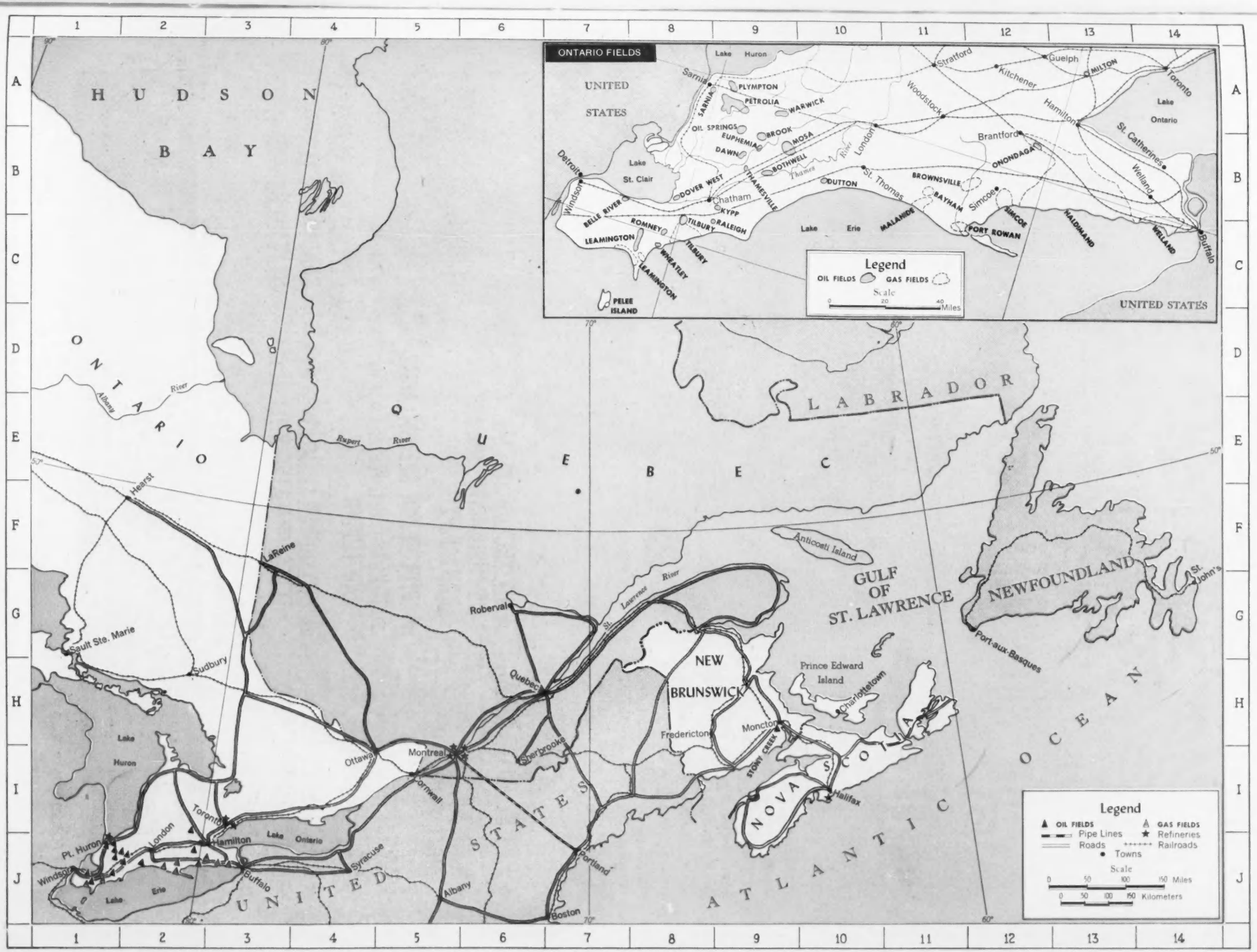
Rocky Mountain Area
Industrial Power Units, Inc., Casper, Wyo.

Northern Louisiana & Mississippi
Ingersoll Corporation, Shreveport, La., Jackson, Miss.

West Coast
Le Roi-Rix Machinery Company, Los Angeles

Western Pennsylvania—Western New York
Lloyd, Smith Company—Bradford, Pa.

*Sales facilities only



CANADA—Eastern Area

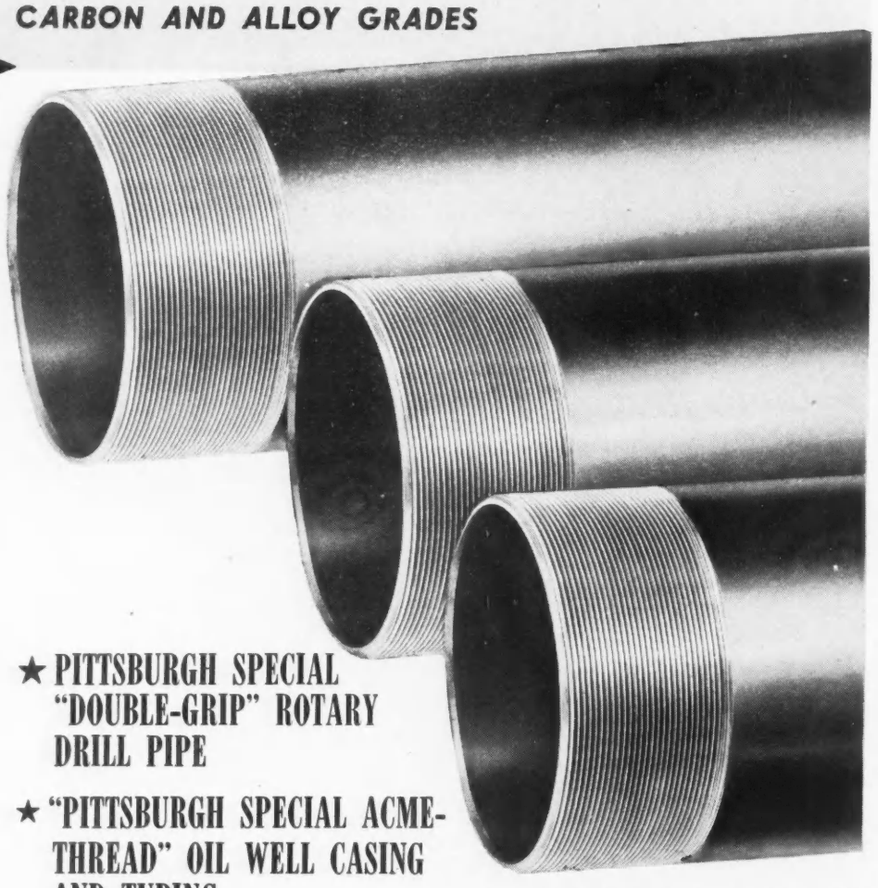
PITTSBURGH STEEL COMPANY

SEAMLESS

OIL COUNTRY TUBULAR PRODUCTS

LUCEY

CARBON AND ALLOY GRADES



Pittsburgh Seamless Products are superior because of their homogeneous wall structure and uniform strength throughout. Their high quality is a natural result of 43 years of research and development devoted exclusively to Seamless Steel Pipe and Tubes.

★ **A.P.I. STANDARD CASING**

★ **A.P.I. ROTARY DRILL PIPE**

★ **A.P.I. PITTSBURGH OIL WELL TUBING**

★ **A.P.I. PITTSBURGH STANDARD LINE PIPE**

★ **PITTSBURGH SPECIAL "DOUBLE-GRIP" ROTARY DRILL PIPE**

★ **"PITTSBURGH SPECIAL ACME-THREAD" OIL WELL CASING AND TUBING**

★ **PITTSBURGH SEAMLESS BOILER TUBES, CRACKING STILL TUBES**

★ **PITTSBURGH SEAMLESS CONDENSER TUBES, HEAT EXCHANGER TUBES**

Exclusive Export Distributor

LUCEY EXPORT CORPORATION

233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentina

San Fernando, Trinidad, B. W. I. ● 615 8th Avenue West, Calgary, Canada

CANADA—Eastern Area

EXPLORATORY TESTS

THERE were 15 wildcat tests drilled in Eastern Canada during 1945 and all were dry. Principal driller was Imperial Oil Company, Ltd., with 11 tests of its own and an interest in another, a majority being in Kent County. Three tests were drilled by M. Strobie, two in Simcoe County and one in York County. Deepest test drilled was Union Gas and Imperial's Carroll 1, Kent County, abandoned in granite at 3685 feet.

* * *

The cooperation of Colonel R. B. Harkness, Natural Gas Commissioner, Ontario Department of Mines, is gratefully acknowledged.

Natural Gas Pipe Lines of Eastern Canada
(All in Use)

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Year Completed
Dominion Natural Gas Co.	Tilbury	Hamilton	175	12, 10, 8	1912
Dominion Natural Gas Co.	Tilbury	Kingsville	30	8	1912
Dominion Natural Gas Co.	Haldimand	Hamilton	(2) 50	10	1910
				8	1906
Union Gas Co. (Canada)...	Haldimand	Hamilton	50	8	1936
Union Gas Co. (Canada)...	Dawn	London	60	10	1935
Union Gas Co. (Canada)...	Tilbury	Windsor...	50	(2) 10	1906
					1908
Union Gas Co. (Canada)...	Tilbury	Sarnia	55	10	1910

Oil Wells and Production in Eastern Canada

Field, Province	Year of Discovery	Total Producing End of 1945	CRUDE OIL PRODUCTION (Barrels) Year 1944	Year 1945
Bothwell, Ontario	1895	186	24,966	22,791
Dunwich, Ontario	....	21	1,728	1,676
Moore, Ontario	1904	6	133	247
Mosa, Ontario	1904	134	15,585	14,344
Oil Springs, Ontario	1861	710	28,537	25,657
Onondaga, Ontario	1910	3	7	24
Petrolia, Ontario	1865	474	41,433	39,350
Plympton, Ontario	....	1	27	9
Sarnia, Ontario	....	6	268	190
Dover, Raleigh-Romney, Ontario	....	15	7,642	5,935
Dawn, Ontario	....	2	257	362
Warwick, Ontario	....	15	4,484	2,739
Totals	....	1,537	125,067	113,324

Recent Drilling in Eastern Canada Fields

Field, Province	WELLS COMPLETED IN FIELDS IN 1945 Oil	Gas	Dry	Wells	Total Footage
Bothwell, Ontario	....	....	3	3	1,640
*Dawn, Ontario	....	....	1	1	1,760
*Elgin, Ontario	....	1	1	2	1,368
*Haldimand, Ontario	....	97	43	140	114,310
*Lincoln, Ontario	....	5	....	5	2,303
Moore, Ontario	....	....	1	1	850
Mosa, Ontario	2	....	....	2	800
*Norfolk, Ontario	....	28	23	51	36,113
Onondaga, Ontario	....	....	1	1	500
Sarnia, Ontario	....	....	1	1	586
*Tilbury, Ontario	....	4†	....	4†	4,948
*Welland, Ontario	....	25	9	34	26,334
*Wentworth, Ontario	....	3	2	5	2,335
Warwick, Ontario	3	....	6	9	3,743
*Zone, Ontario	....	16	13	29	45,694
*Chatham, Ontario	....	....	3	3	7,384
Other Areas, Ontario	....	....	12	12	8,953
Total	5	179	119	303	259,621

* Indicates Gas field.
† These 4 wells drilled in Lake Erie opposite the Tilbury field.

Eastern Canadian Refineries

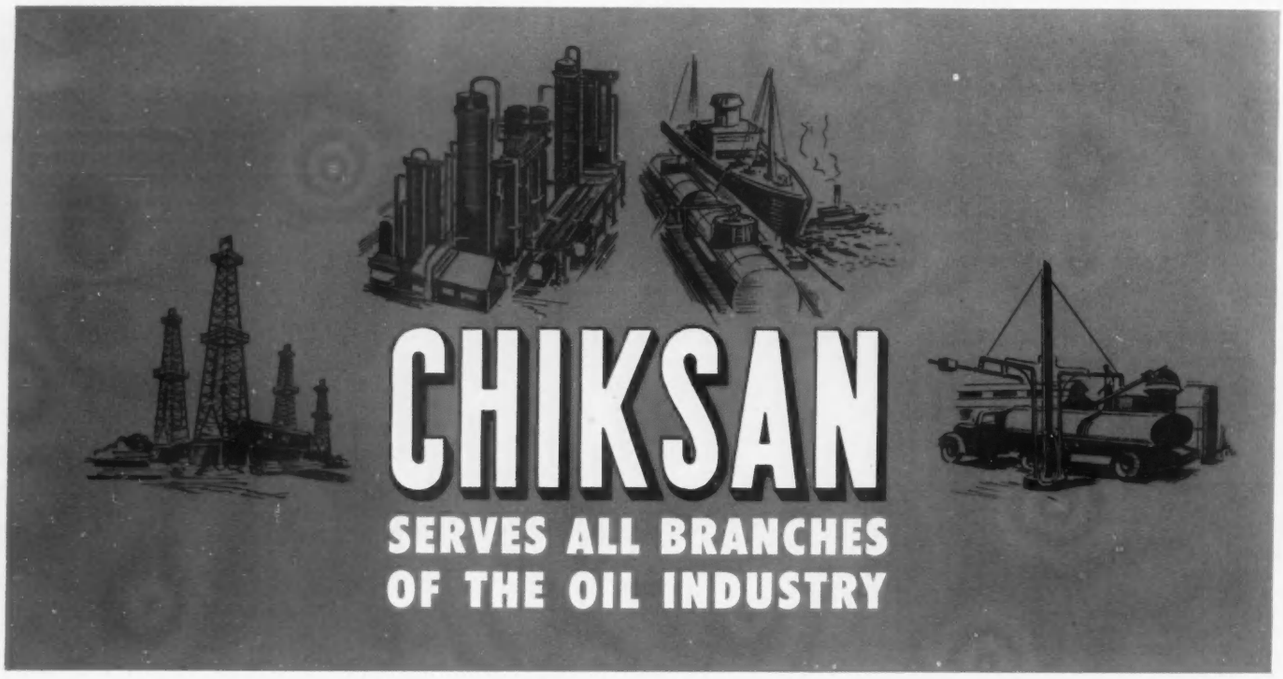
COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery
New Brunswick:				
New Brunswick G. & O. flds., Ltd.	Weldon	250	None	Skimming
Nova Scotia:				
Imperial Oil, Ltd.	Dartmouth	34,000	11,600	S-C-A
Ontario:				
British-American Oil Co., Ltd.	Clarkson	8,250	4,500	Complete
Burlington Refineries, Ltd.	Hamilton	600	None	Skimming
Canadian Oil Companies, Ltd.	Petrolia	3,500	1,500	S-C-L-W
Good Rich Refining Co., Ltd.	Port Credit	4,000	1,300	Skim-Crk.
Imperial Oil, Ltd.	Sarnia	41,500	20,000	Complete
McColl-Frontenac Oil Co., Ltd.	Toronto	13,000	3,300	Skim-Crk.
British-American Oil Co., Ltd.	Toronto	6,000	3,000	Skim-Crk.
Quebec:				
British-American Oil Co., Ltd.	Montreal	17,000	7,500	S-C-A
Imperial Oil, Ltd.	Montreal	25,000	9,800	S-C-L-A
McColl-Frontenac Oil Co., Ltd.	Montreal	20,000	12,500	Skim-Crk.
Shell Oil Co. of Canada, Ltd.	Montreal	10,000	7,500	Skim-Crk.

Note: All Refineries listed are operating. General Petroleum Refineries' 300-bbl. crude charging capacity, skimming plant at Pointe-aux Trembles is shut down.

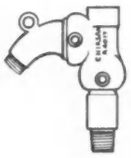
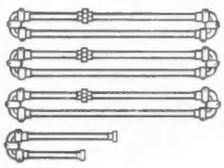
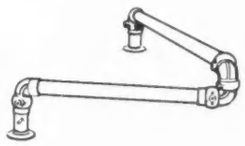
Engineering and Geological Data on Eastern Canada Fields

FIELD, PROVINCE	Location on Map Page 51	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION Name	Kind (Lime, Sand, Etc.)	Age	Depth of Wells (Feet) Minimum to Top of Pay	Maximum Total Depth of Wells	Type Structure
Bothwell, Ontario	B-9	400	36	Onondaga	Lime	Devonian	395	410	Anticline.
Brant, Ontario*	B-12	.....	..	Medina Cataract	Lime and Sand	L. Silurian	360	532	Monocline.
Dawn, Ontario	B-9	600	40	Onondaga	Lime	Devonian	320	370	Dome, fault and reef.
Dawn, Ontario†		600	36	Guelph-Salina	Lime	Silurian	1600	1800	
Declute, Ontario*	....	600	..	Salina-Guelph	Lime	Mid-Silurian	....	....	Anticlines, faulting.
Dover, Ontario	B-8	900	36	Trenton	Lime	Ordovician	2950	3300	Fault.
Dunwich, Ontario	.....	500	..	Onondaga	Lime	Devonian	330	400	Dome.
Elgin, Ontario*	.....	.....	..	Clinton	Lime	L. Silurian	1250	1400	Monocline.
Essex, Ontario†	.....	2000	40	Salina-Guelph	Lime	Silurian	900	1100	Anticline, faulting.
Haldimand, Ontario*	BC-12, 13	145,000	..	Medina-Cataract	Sand, Lime	L. Silurian	350	900	Monocline.
Kent, Ontario* (see Tilbury)	C-8	15,000	..	Salina-Guelph	Lime	M. Silurian	1200	1400	Dome, faulting.
Lincoln, Ontario*	....	5,400	..	Medina-Cataract	Lime and Sand	L. Silurian	315	500	Monocline.
Middlesex, Ontario*	....	200	..	Grimsby	Lime	L. Silurian	1450	1500	Monocline.
Mosa, Ontario	B-9	4,000	..	Widder, Onondaga, Delaware.	Lime	Devonian	275	425	Dome.
Norfolk, Ontario*	.....	18,900	..	Clinton Whirlpool		L. Silurian	870	1200	Lens.
Oil Springs, Ontario	A-9	750	38	Onondaga	Lime	Devonian	370	400	Dome.
Onondaga, Ontario	B-12	1,920	39	Medina-Cataract	Sand	Silurian	480	650	Monocline.
Petrolia, Ontario	A-9	8,000	36	Onondaga	Lime	Devonian	470	510	Anticline.
Thamesville, Ontario	B-9	300	..	Onondaga	Lime	Devonian	370	380	Anticline.
Tilbury, Ontario	C-8	3,000	..	Salina and Guelph	Lime	Silurian	1050	1400	Anticline.
Welland, Ontario*	BC-14	38,000	..	Medina-Cataract	Lime, Sand	Silurian	400	910	Monocline.
Wentworth, Ontario (see Haldimand)	B-12, 13	6,000	..	Clinton, Medina, Cataract	Lime, Sand	L. Silurian	300	440	Monocline.
Stony Creek, New Brunswick	H-9	1,625	..	.....	.....	Mississippian	1500	3200	Antieline and Monocline.

* Indicates gas field. † Indicates both oil and gas.



CHIKSAN *All-Steel* Rotary Hose has proved its safety and economy under the most severe conditions.

CHIKSAN Circulating Heads  have won acceptance by peerless performance and economy. The CHIKSAN Mud Gun is the acknowledged leader among all mud guns. CHIKSAN Cementing Hose  is used as standard equipment by leading cementing companies. Petroleum products are loaded and unloaded quickly and safely through CHIKSAN Marine and Barge Hose  And CHIKSAN *Ball-Bearing* Swivel Joints are used in refineries on loading racks for tank cars and tank trucks, on transfer lines to storage tanks . . . wherever flexibility is required. All these CHIKSAN Products are illustrated and described in the new Chiksan Catalog. Write for your copy today.

REPRESENTATIVES IN PRINCIPAL CITIES

EXPORT REPRESENTATIVE: Chiksan Export Co., Brea, California

Branches: New York 7, Houston 2

CHIKSAN

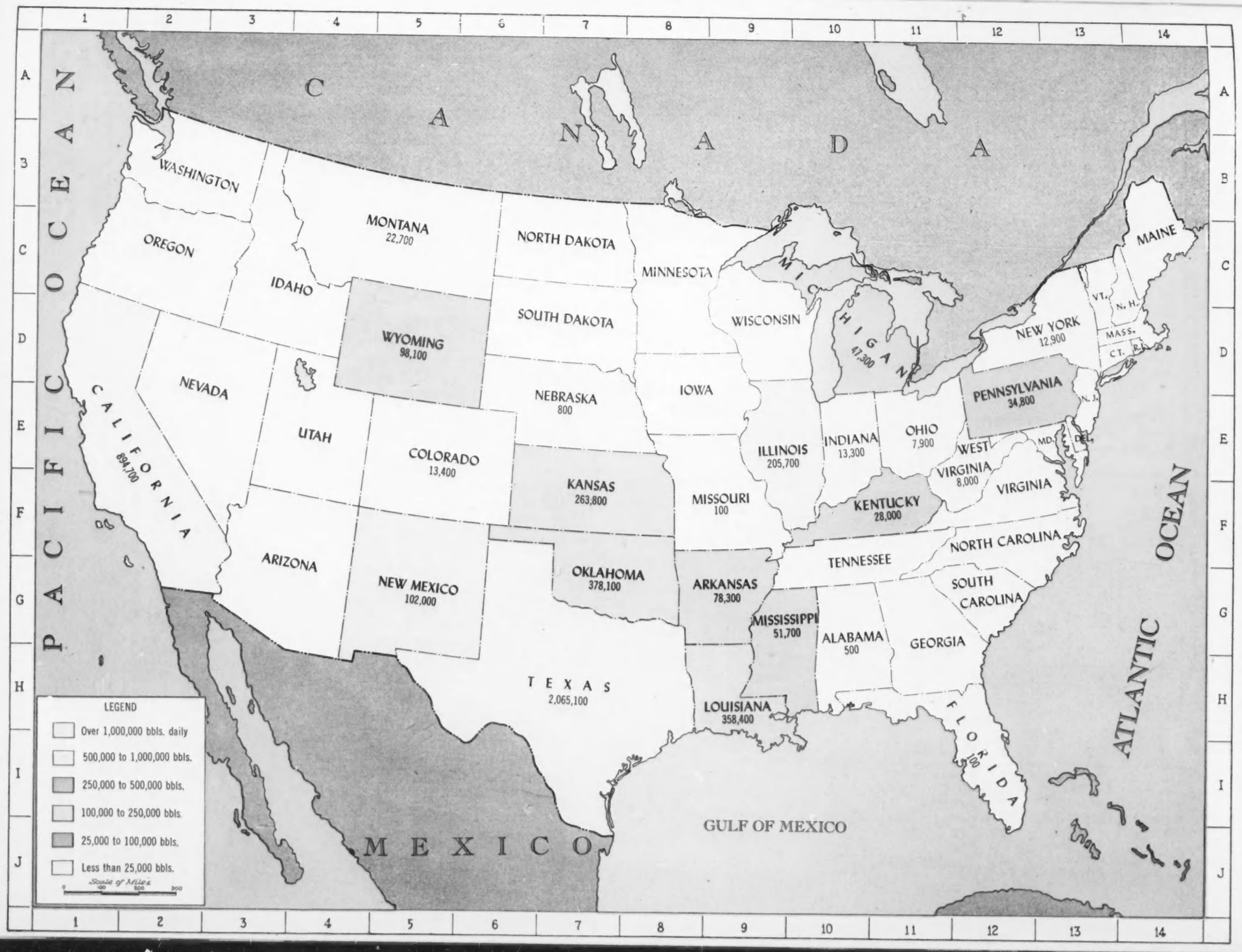
TRADE MARK REG.

BALL BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHIKSAN COMPANY

BREA, CALIFORNIA

New York 7 Houston 2


CANADA
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
MEXICO
WASHINGTON
OREGON
CALIFORNIA
894,700
IDAHO
NEVADA
MONTANA
22,700
WYOMING
98,100
UTAH
COLORADO
13,400
ARIZONA
NEW MEXICO
102,000
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
800
KANSAS
263,800
OKLAHOMA
378,100
TEXAS
2,065,100
MINNESOTA
IOWA
MISSOURI
100
ARKANSAS
78,300
LOUISIANA
358,400
WISCONSIN
ILLINOIS
205,700
MICHIGAN
47,300
INDIANA
13,300
OHIO
7,900
KENTUCKY
28,000
TENNESSEE
MISSISSIPPI
51,700
ALABAMA
500
GEORGIA
FLORIDA
100
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
8,000
PENNSYLVANIA
34,800
NEW YORK
12,900
MAINE
VT.
N. H.
MASS.
CT.
R. I.
N. J.
MD.
DEL.
LEGEND
Over 1,000,000 bbls. daily
500,000 to 1,000,000 bbls.
250,000 to 500,000 bbls.
100,000 to 250,000 bbls.
25,000 to 100,000 bbls.
Less than 25,000 bbls.
Scale of Miles
0
100
200
300

United States Crude Oil Production, by States, by Years

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

YEAR	Arkansas	California	Colorado	Illinois	Indiana	Kansas	Kentucky	Louisiana	Michigan	Mississippi	Missouri	Montana	Nebraska	New Mexico
1859														
1860							[E]							
1861							[E]							
1862							[E]							
1863							[E]							
1864							[E]							
1865							[E]							
1866							[E]							
1867							[E]							
1868							[E]							
1869							[E]							
1870							[E]							
1871							[E]							
1872							[E]							
1873							[E]							
1874							[E]							
1875							[E]							
1876		12					[G E]							
1877		13					[G E]							
1878		15					[G E]							
1879		20					[G E]							
1880		40					[G E]							
1881		100					[G E]							
1882		129					[G E]							
1883		143					[G5]							
1884		262					[G4]							
1885		325					[G5]							
1886		377					[G5]							
1887		678	76				[G5]							
1888		690	298				[G5]							
1889		303	317	1	33	1	[G5]				[H]			
1890		307	369	1	64	1	[G6]				[H]			
1891		324	666	1	137	1	[G9]				[H]			
1892		385	824	1	698	5	[G7]				[H]			
1893		470	594	1	2,335	18	[G3]				[H]			
1894		706	516	[H]	3,689	40	[G2]				[H]			
1895		1,209	438	[H]	4,386	44	[G2]				[H]			
1896		1,253	361	[H]	4,681	114	[G2]				[H]			
1897		1,903	385	1	4,122	81	[G H]				[H]			
1898		2,257	444	[H]	3,731	72	[G6]				[H]			
1899		2,642	390	[H]	3,848	70	[G18]				[H]			
1900		4,325	317	[H]	4,874	75	[G62]		[J]		[J2]			
1901		8,787	461	[H]	5,757	179	[G137]		[J]		[J2]			
1902		13,984	397	[H]	7,481	332	[G185]	549	[J]		[J1]			
1903		24,382	484		9,186	932	[G554]	918	[J]		[J3]			
1904		29,649	501		11,339	4,251	[G998]	2,959	[J]		[J3]			
1905		33,428	376	181	10,964	[I]3,750	[G]1,217	8,910	[J]		[J3]			
1906		33,099	328	4,397	7,674	[I]3,627	[G]1,214	9,077	[J]		[J3]			
1907		39,748	332	24,282	5,128	2,410	[G]821	5,000	[J]		[J4]			
1908		44,855	380	33,686	3,283	1,801	728	5,789	[J]		[J15]			
1909		55,472	311	30,898	2,296	1,264	639	3,060	[J]		[J6]			
1910		73,011	240	33,143	2,160	1,128	469	6,841	[J]		[J4]			
1911		81,134	227	31,317	1,695	1,279	472	10,721	[J]		[J8]			
1912		87,269	206	28,602	970	1,593	484	9,263	[K]					
1913		97,788	189	23,894	956	2,375	525	12,499	[K]		[K]			[K]
1914		99,775	223	21,920	1,336	3,104	503	14,309	[K]		[K]			
1915		86,592	208	19,042	876	2,823	437	18,192	[K]		[K]			
1916		90,952	197	17,714	769	8,738	[L]1,202	15,248	[K]		[K]	45		
1917		93,878	121	15,777	760	36,536	[L]3,088	11,392	[K]			100		
1918		97,532	143	13,366	878	45,451	[L]4,368	16,043	[K]			69		
1919		101,183	121	11,960	972	33,048	9,278	17,188	[K]		[K]	90		[K]
1920	[K]	103,377	111	10,774	945	39,005	8,738	35,714			[K]	340		[K]
1921	10,473	112,600	108	10,043	1,158	36,456	9,013	27,103			[K]	1,509		[K]
1922	12,712	138,468	97	9,383	1,087	31,766	8,973	35,376			[K]	2,449		[K]
1923	36,610	262,876	86	8,707	1,043	28,250	8,069	24,919			[K]	2,782		[K]
1924	46,028	228,933	445	8,081	935	28,836	7,407	21,124				2,815		98
1925	77,398	232,492	1,226	7,863	829	38,357	6,759	20,272	4			4,091		1,060
1926	58,332	224,673	2,768	7,760	808	41,498	6,274	23,201	94			7,727		1,666
1927	40,005	231,196	2,831	6,994	852	41,069	6,719	22,818	439			5,058		1,226
1928	32,096	231,811	2,774	6,462	1,052	38,596	7,359	21,847	594			4,015		943
1929	24,917	292 534	2,358	6,319	981	42,813	7,775	20,554	4,528			3,980		1,830
1930	19,702	227,329	1,656	5,736	994	41,638	7,389	23,272	3,911			3,349		10,189
1931	14,791	188,830	1,545	5,039	840	37,018	6,456	21,804	3,789			2,830		15,227
1932	12,051	178,128	1,136	4,673	806	34,848	6,287	21,807	6,910		[K]	2,457		12,455
1933	11,686	172,010	919	4,244	737	41,976	4,608	25,168	7,942	[K]	[K]	2,273		14,116
1934	11,182	174,305	1,139	4,479	838	46,482	4,860	32,869	10,603	[K]	[K]	3,603		16,864
1935	11,008	207,832	1,560	4,322	777	54,843	5,258	50,330	15,776	[K]	[K]	4,603		20,483
1936	10,469	214,773	1,650	4,475	822	58,317	5,633	80,491	11,928		[K]	5,868		27,223
1937	11,764	238,521	1,605	7,499	844	70,761	5,484	90,924	16,628		[K]	5,805		38,854
1938	18,180	249,749	1,412	24,075	995	60,064	5,821	95,208	18,745		[K]	4,946		35,759
1939	21,238	224,354	1,404	94,912	1,711	60,703	5,621	93,646	23,462	107	40	5,960	2	37,637
1940	25,775	223,881	1,626	147,647	4,978	66,139	5,188	103,584	19,753	4,400	44	6,728	276	39,129
1941	26,327	230,263	2,150	132,393	7,411	83,242	4,762	115,908	16,359	15,327	47	7,526	1,898	39,569
1942	26,628	248,326	2,199	106,391	6,743	97,636	4,534	115,785	21,754	28,833	36	8,074	1,237	31,544
1943	27,600	284,188	2,320	82,260	5,283	106,178	7,883	123,592	20,768	18,807	36	7,916	635	38,896
1944	29,418	311,793	2,944	77,413	5,118	98,762	9,621	129,207	18,490	16,337	36	8,627	417	39,555
1945[P]	28,600	326,555	4,895	75,064	4,859	96,299	10,231	130,806	17,260	18,862	45	8,270	306	37,216
Total	644,990	6,971,203	54,404	1,173,193	160,524	1,576,695	204,192	1,675,287	239,737	102,673	338	123,905	4,771	461,539

[A] Utah production estimated at 3,650 barrels in 1939: 3,126 barrels in 1940; and 189,726 barrels cumulative thorugh 1940.

[B] *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, shows for Alaska the following data: 1904-1919, estimated, 56,000 barrels; 1920, 11,000 barrels; 1921, 10,000 barrels; 1922-1928, estimated, 73,000 barrels; total, 1904-1928, 150,000 barrels.

[C] "Unclassified" includes 1912, Alaska and Michigan; 1913, Alaska, Michigan, Missouri and New Mexico; 1914-16, Alaska, Michigan and Missouri; 1917-18, Alaska and Michigan; 1919, Alaska, Michigan, Missouri and New Mexico; 1920. Alaska, Arkansas, Missouri, New Mexico and Utah; 1921-23, Alaska, Missouri and New Mexico; 1924-31, Alaska and Utah; 1932, Alaska, Missouri and Utah; 1933, Alaska, Mississippi, Missouri and Utah; 1934, Mississippi, Missouri and Utah; 1935, Mississippi, Missouri, Tennessee and Utah; 1936-40, Missouri, Tennessee and Utah; 1943, Florida 4 and Virginia 2; 1944, Alabama 43 and Florida 12; 1945, Alabama 169 and Florida 34.

[D] Pennsylvania and New York separated in years 1864-1881, by aid of *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer.

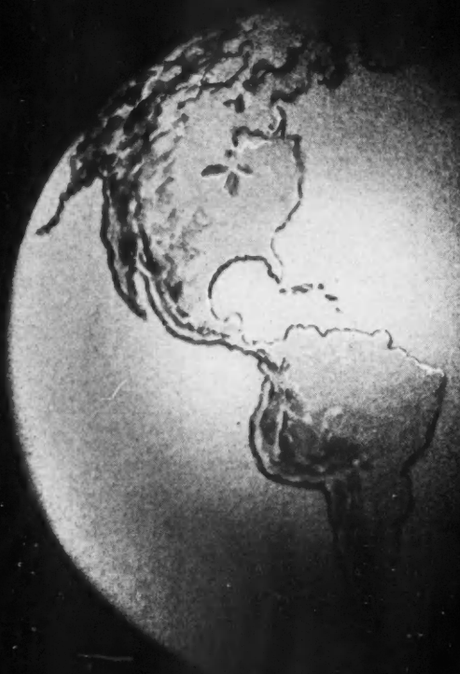
[E] *Petroleum in the United States and Possessions*, by Arnold and Kemnitzer, gives the following additional estimates which are not shown by the official *Mineral Resources;* Ohio, 1860-1875, 200,000 barrels; West Virginia, 1860-1875, 2,800,000 barrels; Kentucky, 1860-1882, 161,000 barrels.

United States Crude Oil Production, by States, by Years—(Continued)

Data in thousands of barrels; from *Mineral Resources and Minerals Yearbook*, except where otherwise indicated in footnotes.

New York	Ohio	Oklahoma	Pennsylvania	Tennessee	Texas	[A] Utah	West Virginia	Wyoming	[B] Alaska	[C] Unclassified	Total United States	Total Value At Wells (Thousands of Dollars)	[O] Average Value Per Bbl.	YEAR
.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	2	$ 32	$20.00	1859
.....	[E]	.....	500	.....	.....	.....	[E]	.....	.....	.....	500	4,800	9.60	1860
.....	[E]	.....	2,114	.....	.....	.....	[E]	.....	.....	.....	2,114	1,036	.52	1861
.....	[E]	.....	3,057	.....	.....	.....	[E]	.....	.....	.....	3,057	3,210	1.05	1862
.....	[E]	.....	2,611	.....	.....	.....	[E]	.....	.....	.....	2,611	8,226	3.15	1863
[D F H]	[E]	.....	[D F] 2,116	.....	.....	.....	[E]	.....	.....	.....	2,116	20,897	8.15	1864
[D] 100	[E]	.....	[D] 2,398	.....	.....	.....	[E]	.....	.....	.....	2,498	16,460	6.59	1865
[D] 144	[E]	.....	[D] 3,454	.....	.....	.....	[E]	.....	.....	.....	3,598	13,455	3.75	1866
[D] 134	[E]	.....	[D] 3,213	.....	.....	.....	[E]	.....	.....	.....	3,347	8,067	2 40	1867
[D] 146	[E]	.....	[D] 3,500	.....	.....	.....	[E]	.....	.....	.....	3,646	13,217	3.62	1868
[D] 169	[E]	.....	[D] 4,046	.....	.....	.....	[E]	.....	.....	.....	4,215	23,730	5.60	1869
[D] 211	[E]	.....	[D] 5,050	.....	.....	.....	[E]	.....	.....	.....	5,261	20,504	3.90	1870
[D] 208	[E]	.....	[D] 4,997	.....	.....	.....	[E]	.....	.....	.....	5,205	22,591	4 40	1871
[D] 252	[E]	.....	[D] 6,041	.....	.....	.....	[E]	.....	.....	.....	6,293	21,440	3.75	1872
[D] 396	[E]	.....	[D] 9 498	.....	.....	.....	[E]	.....	.....	.....	9 894	18,100	1.80	1873
[D] 437	[E]	.....	[D] 10,490	.....	.....	.....	[E]	.....	.....	.....	10,927	12,648	1.15	1874
[D] 352	[E]	.....	[D] 8,436	.....	.....	.....	[E]	.....	.....	.....	8,788	7,368	.97	1875
[D] 359	32	.....	[D] 8,610	[G]	.....	.....	120	.....	.....	.....	9,133	22,983	2.52	1876
[D] 525	30	.....	[D] 12,610	[G]	.....	.....	172	.....	.....	.....	13,350	31,789	2.38	1877
[D] 607	38	.....	[D] 14,557	[G]	.....	.....	180	.....	.....	.....	15,397	18,045	1 17	1878
[D] 787	29	.....	[D] 18,898	[G]	.....	.....	180	.....	.....	.....	19 914	17,211	.86	1879
[D] 1,041	39	.....	[D] 24,987	[G]	.....	.....	179	.....	.....	.....	26,286	24,601	.94	1880
[D] 1,095	34	.....	[D] 26,281	[G]	.....	.....	151	.....	.....	.....	27,661	25,448	92	1881
6,685	40	.....	23,368	[G]	.....	.....	128	.....	.....	.....	30,350	23,631	78	1882
4,004	47	.....	19,125	[G]	.....	.....	126	.....	.....	.....	23,450	25,790	1.10	1883
3,231	90	.....	20,541	[G]	.....	.....	90	.....	.....	.....	24,218	20,596	.85	1884
2,658	662	.....	18,118	[G]	.....	.....	91	.....	.....	.....	21,859	19,198	.88	1885
2,151	1,783	.....	23,647	[G]	.....	.....	102	.....	.....	.....	28,065	19,996	.71	1886
2,075	5,023	.....	20,281	[G]	.....	.....	145	.....	.....	.....	28,283	18,877	.67	1887
1,789	10,011	.....	14 700	[G]	.....	.....	119	.....	.....	.....	27,612	17,948	.65	1888
1,897	12,472	.....	19 591	[G]	[H]	.....	544	.....	.....	.....	35,164	26,963	.77	1889
1,658	16,125	.....	26,800	[G]	[H]	.....	493	.....	.....	.....	45,824	35,365	.77	1890
1,585	17,740	[H]	31,424	[G]	[H]	.....	2,406	.....	.....	.....	54,293	30,527	.56	1891
1,273	16,363	[H]	27,149	[G]	[H]	.....	3,810	.....	.....	.....	50,515	25,907	.51	1892
1,032	16,249	[H]	19,283	[G]	[H]	.....	8,446	.....	.....	.....	48,431	28,950	60	1893
942	16,792	[H]	18,078	[G]	[H]	.....	8,577	2	.....	.....	49,344	35,522	.72	1894
913	19,545	[H]	18,231	[G]	[H]	.....	8,120	4	.....	.....	52,892	57,632	1 09	1895
1,205	23,941	[H]	19,379	[G]	1	.....	10,020	3	.....	.....	60,960	58,519	.96	1896
1,279	21,561	1	17,983	[G]	66	.....	13,090	4	.....	.....	60,476	40,874	.68	1897
1,205	18,739	.....	14,743	[G]	546	.....	13,615	6	.....	.....	55,364	44,193	80	1898
1,321	21,142	.....	13,054	[G]	669	.....	13,911	6	.....	.....	57,071	64,604	1.13	1899
1,301	22,363	6	13,258	[G]	836	.....	16,196	6	.....	.....	63,621	75,989	1.19	1900
1,207	21,648	10	12,625	[G]	4,394	.....	14,177	5	.....	.....	69,389	66,417	.96	1901
1,120	21,014	37	12,064	[G]	18,084	.....	13,513	6	.....	.....	88,767	71,179	.80	1902
1,163	20,480	139	11,355	[G]	17,956	.....	12,900	9	.....	.....	100,461	94,694	.94	1903
1,113	18,877	1,367	11,126	[G]	22,241	.....	12,645	12	[N]	.....	117,081	101,175	.86	1904
1,118	16,347	[I] 8,264	10,437	[G]	28,136	.....	11,578	8	.....	.....	134,717	84,157	.62	1905
1,243	14,788	[I] 18,091	10,257	[G]	12,568	.....	10,121	7	.....	.....	126,494	92,445	.73	1906
1,212	12,207	43,524	10,000	[G]	12,323	[M]	9 095	[M] 9	[N]	.....	166,095	120,107	.72	1907
1,160	10,859	45 799	9 424	.....	11,207	[M]	9,523	[M] 18	.....	.....	178,527	129,079	.72	1908
1,135	10,633	47,859	9,299	.....	9.534	[M]	10,715	[M] 20	.....	.....	183,171	128,329	.70	1909
1,054	9,916	52,029	8,795	.....	8,899	[M]	11,753	[M] 115	.....	.....	209.557	127,900	.61	1910
953	8,817	56,069	8,248	.....	9,526	[M]	9,796	[M] 187	[N]	.....	220,449	134,045	.61	1911
874	8,969	51,427	7,838	.....	11.735	[M]	12,129	[M] 1 572	[K]	4	222,935	164,213	.74	1912
948	8,781	63,579	7,917	.....	15,010	[N]	11,567	2,407	[K]	11	248,416	237,121	95	1913
939	8,536	73,632	8,170	.....	20,068	[N]	9,680	3,560	[K]	8	265,763	214,125	.81	1914
888	7,825	97,915	7,838	.....	24,943	[N]	9,265	4,246	[K]	14	281,104	179,463	.64	1915
874	7,744	107,072	7,593	[L] 1	27,645	[N]	8,731	6,234	[K]	8	300,767	330,900	1.10	1916
880	7,751	107,508	7,733	[L] 12	32,413	[N]	8,379	8,978	[K]	10	335 316	522,635	1.56	1917
809	7,285	103,347	7 408	[L] 8	38,750	[N]	7,867	12,596	[K]	8	355,928	703,944	1 98	1918
851	7,736	86,911	8,137	15	79,366	[N]	8,327	13,172	[K]	12	378,367	760,266	2.01	1919
906	7.400	106,206	7,438	14	96,868	[K]	8,249	16,831	[K]	13	442,929	1,360,745	3.07	1920
988	7,335	114,634	7,418	12	106.166	.....	7 822	19,333	[K]	12	472,183	814,745	1.73	1921
1,000	6,781	149,571	7 425	10	118,684	.....	7,021	26,715	[K]	13	557,531	895,111	1.61	1922
1,250	7 085	160,929	7,609	8	131.023	.....	6,358	44,785	[K]	18	732,407	978,430	1.34	1923
1,440	6,811	173,538	7 486	10	134,522	[K]	5,920	39,498	[K]	13	713,940	1,022,683	1.43	1924
1.695	7,212	176 768	8,097	24	144 648	[K]	5 763	29,173	[K]	12	763,743	1.284.960	1.68	1925
1.956	7.272	179.195	8,961	43	166,916	[K]	5.946	25.776	[K]	8	770,874	1,447,760	1 88	1926
2.242	7,593	277,775	9,526	60	217.389	[K]	6,023	21,307	[K]	7	901,129	1,172.830	1.30	1927
2,603	7,015	249.857	9,956	46	257.320	[K]	5,661	21,461	[K]	6	901,474	1,054,880	1.17	1928
3,377	6,743	255,004	11,820	19	296,876	[K]	5.574	19,314	[K]	7	1,007,323	1,280.417	1.27	1929
3,647	6,486	216,486	12,803	21	290,457	[K]	5,071	17,868	[K]	7	898,011	1,070,200	1.19	1930
3,363	5,327	180,574	11,892	6	332,437	[K]	4,472	14.834	[K]	7	851,081	550.630	65	1931
3,508	4,644	153,244	12,412	5	312 478	[K]	3,876	13,418	[K]	16	785,159	680.460	.87	1932
3,181	4,235	182,251	12,624	5	402,609	[K]	3,815	11,227	[K]	30	905.656	608,000	.67	1933
3.804	4,234	180,107	14,478	10	381.516	[K]	4.095	12.556	.....	41	908,065	904.825	1.00	1934
4,236	4,082	185,288	15 810	[K]	392.666	[K]	3,902	13,755	.....	65	996,596	961,440	.96	1935
4.663	3,847	206.555	17,070	[K]	427.411	[K]	3.847	14,582	.....	63	1,099,687	1,199,820	1.09	1936
5,478	3.559	228,839	19,189	[K]	510.318	[K]	3,845	19,166	.....	77	1,279,160	1,513,340	1.18	1937
5,045	3,298	174,994	17.426	[K]	475,850	[K]	3,684	19,022	.....	82	1,214,355	1,373,060	1.13	1938
5,098	3,156	159,913	17,382	50	483,528	4	3,580	21,454	.....	.....	1,264,962	1,294,470	1.02	1939
4,999	3,159	156,164	17,353	24	493.209	3	3,444	25,711	.....	.....	1,353,214	1,385,440	1.02	1940
5,185	3,510	154,702	16,750	12	505,572	4	3,433	29,878	.....	.....	1,402,228	1,602,000	1.14	1941
5.421	3,543	140.690	17,779	9	483,097	.....	3,574	32,812	.....	.....	1,386,645	1.643,470	1.19	1942
5,059	3,322	123,152	15,757	10	593.520	.....	3,349	33,077	.....	[C] 6	1,503,614	1,803,811	1.20	1943
4,697	2,937	124,616	14,118	12	748,122	.....	3,070	32,388	.....	[C] 55	1,677,753	2.046.859	1.22	1944
4,715	2,899	138,005	12,700	12	753,760	.....	2,903	35,810	.....	[C] 203	1,710,275	2,086,535	1.22	.....[P] 1945
154,264	604,588	5,513,643	1,063,762	458	9,663,878	11	427,099	644,943	.....	836	31,486,933	37,326,054	1.18	.....Total

[F] New York included with Pennsylvania.
[G] Tennessee included with Kentucky, 1876-1907, inclusive.
[H] Less than 500 barrels.
[I] Figures for Oklahoma and Kansas for years 1905-1906 shown together by *Mineral Resources;* here divided by aid of *Petroleum in the United States and Possessions,* by Arnold and Kemnitzer.
[J] Michigan shown with Missouri in 1900-1911.
[K] Included under "Unclassified."
[L] Kentucky and Tennessee figures in years 1916-18 obtained with aid of *Mineral Resources* and *Petroleum in the United States and Possessions,* by Arnold and Kemnitzer.
[M] Insignificant production of Utah (mostly used as fuel) shown with Wyoming.
[N] Little production but no record available.
[O] Figures on average price per barrel for years 1859-1875 taken from *Petroleum in the United States and Possessions,* by Arnold and Kemnitzer: remainder from *Mineral Resources* and *Minerals Yearbook* except 1943, 1944, and 1945 estimated.
[P] Bureau of Mines figures for first 10 months; November and December estimated by THE OIL WEEKLY, with aid of weekly reports of American Petroleum Institute and other sources.



As the establishment of world-wide oil reserves moves into greater prominence, our twenty-one years of geophysical surveying experience and accurate interpretation of authentic subsurface data, becomes increasingly valuable in mapping the course of future oil development.

PETTY GEOPHYSICAL ENGINEERING CO.

SAN ANTONIO, TEXAS

SEISMIC • GRAVITY • MAGNETIC SURVEYS

Estimated Petroleum Reserves Proved Up in U. S. in 1945 and indicated Reserves Held at End of Year, by States

(BARRELS)

STATE OR DISTRICT	[1]Proved Reserves January 1, 1945	[2]NEW RESERVES BLOCKED OUT IN 1945				Production During 1945	Proved Reserves as of January 1, 1946
		Through Revisions of Previous Estimates and Extensions to Known Fields	Through New Fields Discovered During Year	Through New Pays Discovered During Year	Total New Reserves Blocked Out In 1945 (Sum of Preceding 3 Columns)		
Alabama	317,000	500,000	1,300,000	.....	1,800,000	169,000	1,948,000
Arkansas	293,059,000	10,000,000	250,000	300,000	10,550,000	28,600,000	275,009,000
California	3,344,552,000	192,000,000	34,000,000	45,000,000	271,000,000	326,555,000	3,288,997,000
Colorado	88,823,000	153,600,000	.....	.....	153,600,000	4,895,000	237,528,000
Florida	[3]125,000	2,180,000	.....	.....	2,180,000	34,000	2,271,000
Illinois	320,714,000	105,000,000	7,000,000	1,200,000	113,200,000	75,064,000	358,850,000
Indiana	31,493,000	11,250,000	1,500,000	800,000	13,550,000	4,859,000	40,184,000
Kansas	601,751,000	10,000,000	24,000,000	1,000,000	35,000,000	96,299,000	540,452,000
Kentucky	41,080,000	10,500,000	3,600,000	80,000	14,180,000	10,231,000	45,029,000
Louisiana	1,573,387,000	102,680,000	51,420,000	56,841,000	210,941,000	130,806,000	1,653,522,000
North Louisiana	[2]285,919,000	44,329,000	3,876,000	360,000	48,565,000	23,998,000	310,486,000
South Louisiana	[2]1,287,468,000	58,351,000	47,544,000	56,481,000	162,376,000	106,808,000	1,343,036,000
Michigan	65,134,000	[4]36,240,000	3,000,000	1,000,000	40,240,000	17,260,000	88,114,000
Mississippi	209,011,000	16,000,000	8,100,000	1,300,000	25,400,000	18,862,000	215,549,000
Missouri	[3]135,000	25,000	.....	.....	25,000	45,000	115,000
Montana	111,650,000	7,200,000	320,000	8,100,000	15,620,000	8,270,000	119,000,000
Nebraska	581,000	.....	.....	.....	.....	306,000	275,000
New Mexico	562,564,000	40,423,000	6,980,000	6,320,000	53,723,000	37,216,000	579,071,000
New York	85,831,000	.....	.....	.....	.....	4,715,000	81,116,000
Ohio	31,624,000	1,100,000	350,000	.....	1,450,000	2,899,000	30,175,000
Oklahoma	970,262,000	65,000,000	30,000,000	4,000,000	99,000,000	138,005,000	931,257,000
Pennsylvania	123,138,000	.....	.....	.....	.....	12,700,000	110,438,000
Tennessee	[3]35,000	.....	.....	.....	.....	12,000	23,000
Texas	11,375,480,000	1,030,304,000	60,791,000	51,481,000	1,142,576,000	753,760,000	11,764,296,000
East Texas	[2]3,737,865,000	96,668,000	540,000	520,000	97,728,000	180,723,000	3,654,870,000
North Texas	[2]493,153,000	50,765,000	10,115,000	3,225,000	64,105,000	53,776,000	503,482,000
West Texas	[2]2,642,775,000	314,865,000	31,510,000	38,480,000	384,855,000	174,299,000	2,853,331,000
Texas Panhandle	[2]421,654,000	.....	.....	.....	.....	31,890,000	389,764,000
Gulf Coast, Upper	[2]2,575,728,000	276,382,000	8,324,000	6,724,000	291,430,000	190,618,000	2,676,540,000
South Texas	[2]1,504,305,000	291,624,000	10,302,000	2,532,000	304,458,000	122,454,000	1,686,309,000
West Virginia	40,755,000	1,000,000	.....	.....	1,000,000	2,903,000	38,852,000
Wyoming	581,730,000	6,120,000	15,000,000	900,000	22,020,000	35,810,000	567,940,000
Total United States	20,453,231,000	1,801,122,000	247,611,000	178,322,000	2,227,055,000	1,710,275,000	20,970,011,000

[1] From American Petroleum Institute, except as footnoted.
[2] Estimated by The OIL WEEKLY.
[3] OIL WEEKLY estimate, dividing A.P.I. figure of 295,000 barrels for "Miscellaneous" states of Florida, Missouri, Tennessee, Utah, and Virginia.
[4] Includes 13,500,000 by actual development and extensions in 1945; 22,740,000 revisions in estimates of older fields on basis of actual performance (includes 17,240,000 increase for Reid City field)

United States Experience in Petroleum Finding

(BARRELS)

YEAR	New Oil Found and Developed	Annual Crude Production	Dry Holes Drilled	Oil Found per Dry Hole	YEAR	New Oil Found and Developed	Annual Crude Production	Dry Holes Drilled	Oil Found per Dry Hole	Wildcat Tests Drilled	Oil Found per Wildcat Drilled
1918	655,928,000	355,928,000	5,613	116,858	1932	85,159,000	785,159,000	3,127	54,466	.....	.....
1919	878,367,000	378,367,000	5,986	146,736	1933	605,656,000	905,656,000	3,369	179,773	.....	.....
1920	942,929,000	442,929,000	7,364	128,045	1934	1,085,065,000	908,065,000	4,678	232,075	.....	.....
1921	1,072,183,000	472,183,000	5,160	207,787	1935	1,219,596,000	996,596,000	5,588	218,252	.....	.....
1922	357,531,000	557,531,000	5,332	67,053	1936	1,763,087,000	1,099,687,000	5,695	309,585	.....	.....
1923	732,407,000	732,407,000	5,214	140,469	1937	3,723,028,000	1,279,160,000	6,370	548,462	2,303	1,616,599
1924	613,940,000	713,940,000	5,152	119,469	1938	3,055,233,000	1,214,355,000	6,133	498,162	2,612	1,169,691
1925	1,763,743,000	763,743,000	6,600	267,233	1939	2,399,828,000	1,264,962,000	6,670	359,794	2,961	810,479
1926	1,070,874,000	770,874,000	8,360	128,094	1940	1,894,717,000	1,353,214,000	6,770	279,869	3,164	598,836
1927	2,601,129,000	901,129,000	6,319	411,636	1941	1,967,009,000	1,402,228,000	6,984	281,645	3,697	532,055
1928	1,401,474,000	901,474,000	6,249	224,271	1942	1,880,142,000	1,386,645,000	5,684	330,777	3,166	593,854
1929	3,207,323,000	1,007,323,000	7,229	443,674	1943	1,484,535,000	1,503,176,000	5,928	250,427	3,612	411,001
1930	1,298,011,000	898,011,000	6,097	212,893	1944	2,067,500,000	1,678,421,000	6,751	306,251	4,324	478,145
1931	251,081,000	851,081,000	3,008	166,942	1945	2,227,055,000	1,710,275,000	7,226	308,200	4,337	513,501

Source: New oil from American Petroleum Institute, except for latest year which is estimated by The OIL WEEKLY. Number dry holes and wildcats drilled from OIL WEEKLY records.

United States Oil Discovery, Production and Reserves

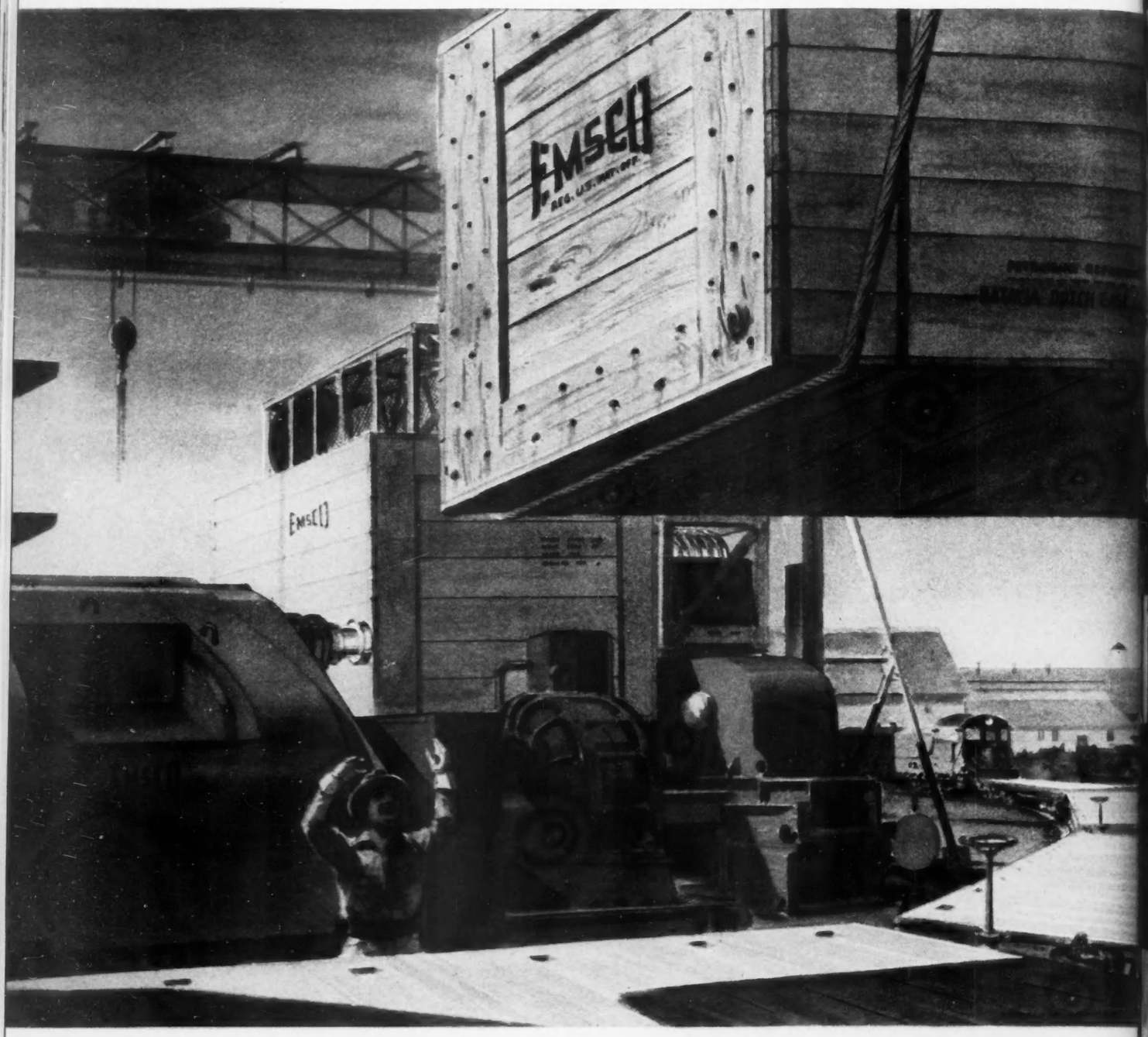
(BARRELS)

End of Year	Accumulated Discoveries	Accumulated Production	Proved Reserves Remaining	End of Year	Accumulated Discoveries	Accumulated Production	Proved Reserves Remaining	End of Year	Accumulated Discoveries	Accumulated Production	Proved Reserves Remaining
1918	10,808,572,000	4,608,572,000	6,200,000,000	1927	20,841,675,000	10,341,675,000	10,500,000,000	1936	31,758,127,000	18,694,727,000	13,063,400,000
1919	11,686,939,000	4,986,939,000	6,700,000,000	1928	22,243,149,000	11,243,149,000	11,000,000,000	1937	35,481,155,000	19,973,887,000	15,507,268,000
1920	12,629,868,000	5,429,868,000	7,200,000,000	1929	25,450,472,000	12,250,472,000	13,200,000,000	1938	38,536,388,000	21,188,242,000	17,348,146,000
				1930	26,748,483,000	13,148,483,000	13,600,000,000	1939	40,936,216,000	22,453,204,000	18,483,012,000
1921	13,702,051,000	5,902,051,000	7,800,000,000					1940	42,830,933,000	23,806,418,000	19,024,515,000
1922	14,059,582,000	6,459,582,000	7,600,000,000	1931	26,999,564,000	13,999,564,000	13,000,000,000				
1923	14,791,989,000	7,191,989,000	7,600,000,000	1932	27,084,723,000	14,784,723,000	12,300,000,000	1941	44,797,942,000	25,208,646,000	19,589,296,000
1924	15,405,929,000	7,905,929,000	7,500,000,000	1933	27,690,379,000	15,690,379,000	12,000,000,000	1942	46,678,084,000	26,595,291,000	20,082,793,000
1925	17,169,672,000	8,669,672,000	8,500,000,000	1934	28,775,444,000	16,598,444,000	12,177,000,000	1943	48,162,619,000	28,098,467,000	20,064,152,000
				1935	29,995,040,000	17,595,040,000	12,400,000,000	1944	50,230,119,000	29,776,888,000	20,453,231,000
1926	18,240,546,000	9,440,546,000	8,800,000,000					1945	52,457,174,000	31,487,163,000	20,970,011,000

Source: American Petroleum Institut , except for latest year which has been estimated by The OIL WEEKLY.

Pacemakers in Oilfield Equipment Design

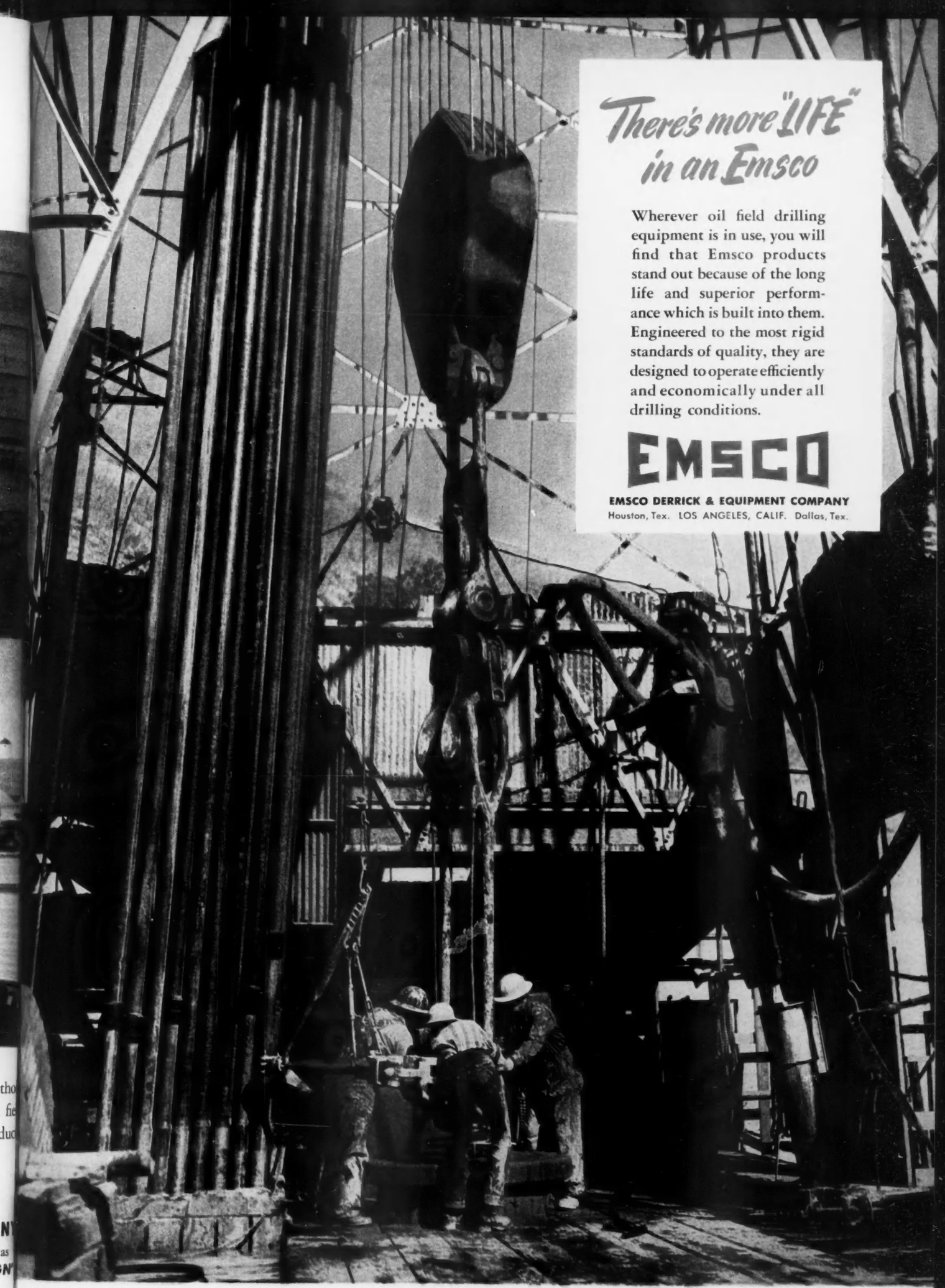
IN AMERICA AND ABROAD



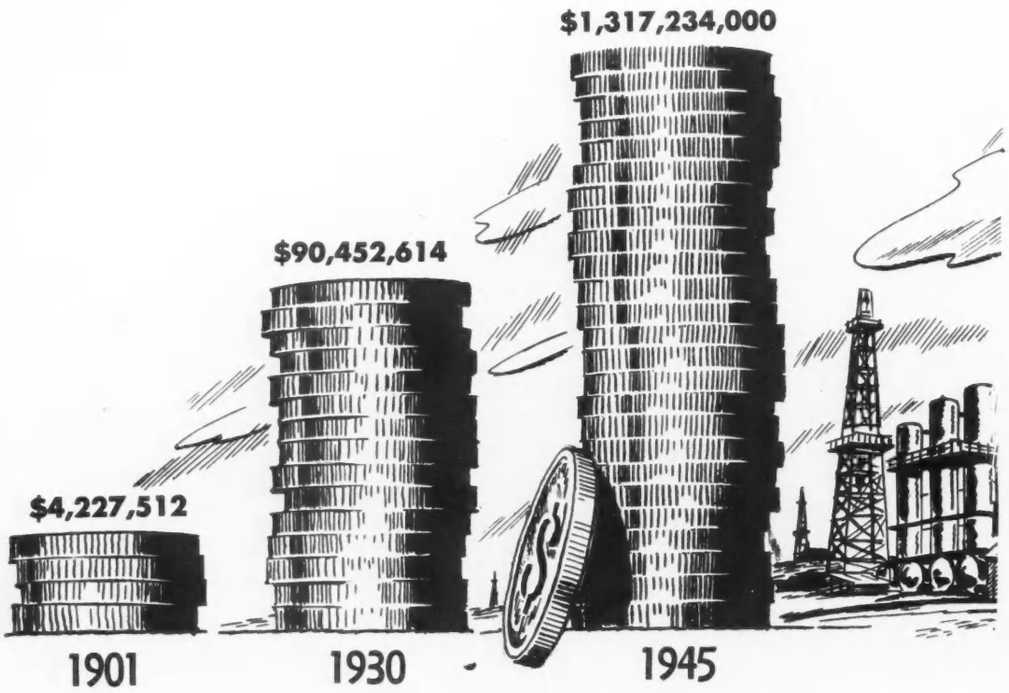
Since the dawn of modern drilling techniques, Emsco has been recognized for its leadership in design, for its achievements in oil field engineering, and for its use of the finest of manufacturing facilities and metho in producing oil field drilling equipment. Wherever oil fie drilling equipment is in use, you will find Emsco produc

EMSCO
REG. U.S. PAT. OFF.

EMSCO DERRICK & EQUIPMENT COMPAN
Houston, Texas LOS ANGELES, CALIFORNIA Dallas, Texas
"PACEMAKERS IN OIL FIELD EQUIPMENT DESIGN"


There's more "LIFE"
in an Emsco
Wherever oil field drilling equipment is in use, you will find that Emsco products stand out because of the long life and superior performance which is built into them. Engineered to the most rigid standards of quality, they are designed to operate efficiently and economically under all drilling conditions.
EMSCO
EMSCO DERRICK & EQUIPMENT COMPANY
Houston, Tex. LOS ANGELES, CALIF. Dallas, Tex.

Dollar value of crude oil production . . . Texas, Oklahoma, Arkansas, Louisiana, and New Mexico



300-Fold Increase in Southwest Oil Since 1901

Southwestern oil wealth has increased more than 300-fold since 1901. Jobs for labor—opportunities for capital have stemmed from the development of each new oil deposit, setting in motion important cycles of wealth-creating activity.

Loans incident to the development, production, transportation, processing, and distribution of oil and gas have become increasingly dominant in the banking activities of the First National Bank in Dallas. For many years, this bank has had the privilege of planning and working with the oil men of the Southwest. Alert to present opportunities and keenly interested in the future possibilities of the oil industry, this leading financial institution is eager to be of service to oil men everywhere.

THE LARGEST BANK IN THE SOUTHWEST

First National Bank in Dallas

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

1st NATIONAL

Refinery Production of Major Products and Percent Yield from Crude Run, By Districts

Results in December and Year, 1945, compared with same periods in 1944 and 1941. Figures are from Bureau of Mines except that November and December 1945 are estimated with aid of A. P. I. weekly bulletins.

(THOUSANDS OF BARRELS)

REFINING DISTRICT	*GASOLINE			KEROSINE			DISTILLATE FUEL OIL			RESIDUAL FUEL			LUBRICANTS		
	1941	1944	1945	1941	1944	1945	1941	1944	1945	1941	1944	1945	1941	1944	1945
Combined East Coast, Texas, Inland, Texas Gulf, La. Gulf, No. Louisiana and Arkansas															
Production, December	32,054	31,359	33,567	4,379	4,088	5,525	10,923	11,830	13,695	15,549	19,593	18,420	2,030	2,033	2,088
(Daily Average)	1,034	1,012	1,083	141	132	178	352	382	442	502	632	594	65	66	67
Percent Yield from Crude	44.4	37.8	38.6	6.5	7.4	7.3	16.3	13.3	18.0	23.2	26.3	24.3	3.0	2.7	2.7
Production, Whole Year	332,070	358,139	390,751	46,988	49,355	52,746	113,953	145,299	153,771	171,077	224,208	219,077	21,415	22,654	23,486
(Daily Average)	910	979	1,011	129	135	145	312	397	421	469	613	600	59	62	64
East Coast															
Production, December	8,256	.....	7,793	886	.....	1,182	3,753	.....	4,197	4,464	.....	7,765	806	.....	748
(Daily Average)	266	.....	251	29	.....	38	121	.....	135	144	.....	250	26	.....	24
Percent Yield from Crude	40.6	.....	33.2	4.5	.....	5.1	19.0	.....	18.0	22.6	.....	33.2	4.1	.....	3.2
Production, Whole Year	85,379	.....	98,101	9,169	.....	10,644	40,766	.....	50,491	51,741	.....	85,441	8,608	.....	8,642
(Daily Average)	234	.....	269	25	.....	29	112	.....	138	142	.....	234	24	.....	24
Inland Texas															
Production, December	4,179	.....	4,068	253	.....	401	191	.....	440	1,274	.....	1,512	23	.....	19
(Daily Average)	135	.....	131	8	.....	13	6	.....	14	41	.....	49	1	.....	1
Percent Yield from Crude	60.4	.....	49.0	4.4	.....	6.2	3.3	.....	6.8	22.1	.....	23.5	0.4	.....	0.3
Production, Whole Year	44,143	.....	50,233	2,987	.....	4,633	2,430	.....	6,271	14,280	.....	22,657	358	.....	256
(Daily Average)	121	.....	138	8	.....	13	7	.....	17	39	.....	62	1	.....	1
Texas Gulf															
Production, December	16,251	.....	17,168	2,331	.....	2,720	5,820	.....	7,037	7,852	.....	7,272	939	.....	1,053
(Daily Average)	524	.....	554	75	.....	88	188	.....	227	253	.....	235	30	.....	34
Percent Yield from Crude	44.6	.....	43.3	6.9	.....	7.8	17.1	.....	20.1	23.1	.....	20.7	2.8	.....	3.0
Production, Whole Year	168,204	.....	186,427	24,448	.....	22,913	59,591	.....	73,704	84,806	.....	87,392	9,677	.....	11,135
(Daily Average)	461	.....	511	67	.....	63	163	.....	202	232	.....	239	26	.....	31
ouisiana Gulf															
Production, December	2,141	.....	3,798	656	.....	1,088	923	.....	1,741	1,287	.....	1,439	206	.....	167
(Daily Average)	69	.....	123	21	.....	35	30	.....	56	41	.....	46	7	.....	5
Percent Yield from Crude	40.5	.....	38.4	13.3	.....	11.7	18.7	.....	18.7	26.1	.....	15.5	4.2	.....	1.8
Production, Whole Year	21,265	.....	44,463	7,304	.....	12,047	8,631	.....	19,746	13,070	.....	17,186	2,093	.....	2,047
(Daily Average)	58	.....	122	20	.....	33	24	.....	54	36	.....	47	6	.....	6
North Louisiana and Arkansas															
Production, December	1,227	.....	740	253	.....	134	236	.....	280	672	.....	432	56	.....	101
(Daily Average)	40	.....	24	8	.....	4	8	.....	9	22	.....	14	2	.....	3
Percent Yield from Crude	43.2	.....	34.1	9.7	.....	7.4	9.0	.....	15.5	25.7	.....	23.9	2.1	.....	5.6
Production, Whole Year	13,079	.....	11,527	3,080	.....	2,509	2,535	.....	3,559	7,180	.....	6,401	679	.....	1,406
(Daily Average)	36	.....	32	8	.....	7	7	.....	10	20	.....	18	2	.....	4
Appalachian															
Production, December	2,277	2,087	2,261	253	303	276	440	535	544	619	733	615	530	426	396
(Daily Average)	74	67	73	8	10	9	14	17	18	20	24	20	17	14	13
Percent Yield from Crude	48.7	43.7	47.3	5.5	6.4	5.9	9.6	6.4	11.6	13.5	15.6	13.1	11.6	9.1	8.4
Production, Whole Year	25,606	24,163	25,924	3,166	3,894	3,327	4,863	6,313	6,145	7,709	9,194	8,971	6,414	5,278	4,825
(Daily Average)	70	66	71	9	11	9	13	17	17	21	25	25	18	14	13
Illinois, Indiana, Kentucky															
Production, December	12,319	12,685	11,599	1,187	1,072	1,518	2,459	2,931	2,768	4,238	4,985	4,321	392	413	365
(Daily Average)	397	409	374	38	35	49	79	95	89	137	161	139	13	13	12
Percent Yield from Crude	52.6	49.0	47.8	5.4	4.4	6.6	11.1	12.1	12.1	19.2	20.6	18.9	1.8	1.7	1.6
Production, Whole Year	138,481	142,276	144,198	11,864	13,665	13,008	26,288	34,544	34,737	46,761	56,890	53,231	4,307	4,526	4,400
(Daily Average)	379	389	395	33	37	36	72	94	95	128	155	146	12	12	12
Oklahoma, Kansas, Missouri															
Production, December	6,333	6,250	6,148	651	648	674	1,232	1,771	1,632	1,898	2,208	2,016	355	422	429
(Daily Average)	204	202	198	21	21	22	40	57	53	61	71	65	11	14	14
Percent Yield from Crude	54.9	49.5	49.4	6.1	5.6	5.8	11.5	15.2	14.1	17.7	18.9	17.4	3.3	3.6	3.7
Production, Whole Year	71,388	68,289	72,693	7,505	7,767	7,977	13,431	19,281	20,643	22,408	23,984	24,596	3,976	4,627	5,310
(Daily Average)	195	187	199	21	21	22	37	53	57	61	66	67	11	13	13
Rocky Mountains															
Production, December	1,460	1,843	1,739	85	104	124	250	402	425	786	1,019	1,056	21	17	27
(Daily Average)	47	59	56	3	3	4	8	13	14	25	33	34	1	1	1
Percent Yield from Crude	48.2	44.7	43.3	3.0	2.7	3.3	8.8	10.5	11.4	27.6	26.6	28.4	0.7	0.4	0.7
Production, Whole Year	17,831	19,984	21,983	906	950	1,107	2,778	4,333	5,157	7,629	11,233	13,258	187	256	269
(Daily Average)	49	55	60	3	3	3	8	12	14	21	31	36	1	1	1
California															
Production, December	7,197	9,885	9,882	127	246	372	1,838	1,589	2,398	8,037	12,740	11,282	226	270	264
(Daily Average)	232	319	319	4	8	12	59	51	77	259	411	364	7	9	9
Percent Yield from Crude	35.5	32.7	35.4	0.7	0.9	1.6	10.3	6.1	10.0	45.1	48.7	47.1	1.3	1.0	1.1
Production, Whole Year	85,734	109,867	122,342	2,157	2,713	2,800	27,803	29,382	29,554	88,411	135,946	148,734	3,240	3,765	3,832
(Daily Average)	235	300	335	6	7	8	76	80	81	242	371	407	9	10	10
Total United States															
Production, December	61,640	64,109	65,196	6,682	6,461	8,489	17,142	19,058	21,462	31,127	41,278	37,710	3,554	3,581	3,569
(Daily Average)	1,988	2,068	2,103	215	208	274	553	615	692	1,004	1,332	1,216	115	116	115
Percent Yield from Crude	45.7	40.0	41.6	5.3	4.5	5.9	13.7	13.1	15.0	24.9	28.8	26.4	2.8	2.5	2.5
Production, Whole Year	671,110	722,718	777,891	72,586	78,344	80,965	189,116	239,152	250,007	343,995	461,455	467,867	39,539	41,106	42,122
(Daily Average)	1,839	1,975	2,131	199	214	222	518	653	685	942	1,262	1,282	108	112	115

* Production indicates straight run, cracked, and natural blended at refineries. Yield indicates percent of crude runs made into straight ru n and cracked gasoline.

Number of Producing Oil Wells and Daily Average Crude Production in the United States

YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year	YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year	YEAR	Number of Producing Oil Wells At End of Year	Gain In No. Producing Oil Wells	New Oil Wells Completed in Year	Production Per Well Per Day During Year
1918	203,375	.....	17,845	.....	1927	323,300	4,700	13,396	7.7	1936	349,450	8,460	18,432	8.7
1919	227,000	23,625	21,052	4.8	1928	327,800	4,500	10,982	7.6	1937	363,030	13,580	22,481	9.8
1920	251,000	24,000	24,273	5.0	1929	328,200	400	13,125	8.4	1938	369,640	6,610	18,544	9.1
1921	274,500	23,500	14,666	4.9	1930	331,070	2,870	10,745	7.5	1939	380,390	10,750	17,687	9.2
1922	284,880	10,380	17,333	5.7	1931	315,850	†15,220	6,618	7.2	1940	393,516	13,126	19,225	9.5
1923	290,100	5,220	13,407	6.6	1932	321,500	5,650	10,151	6.7	1941	403,582	10,066	19,472	9.7
1924	299,100	9,000	14,311	6.2	1933	326,850	5,350	7,828	7.7	1942	407,257	3,675	10,942	9.3
1925	306,100	7,000	16,162	6.5	1934	333,070	6,220	13,066	7.5	1943	407,581	324	9,541	10.1
1926	318,600	12,500	17,787	6.8	1935	340,990	7,920	15,301	8.1	1944	412,851	5,270	13,095	11.2
										1945	421,433	8,582	13,737	10.7

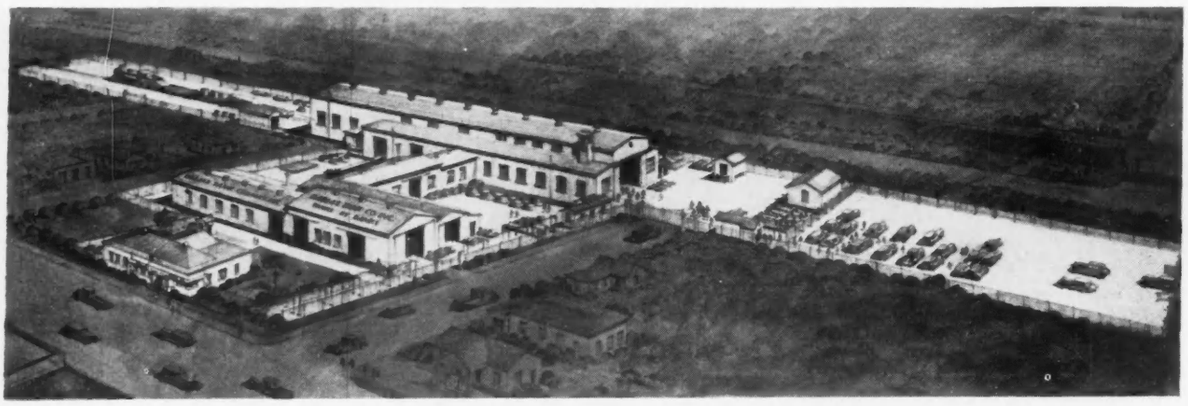
† Decrease; this, the only decrease of recent time, reflecting abandonment or shutting in of many wells when early chaotic development of East Texas field, coupled with business depression, severely depressed crude prices.

SOURCE: Producing well data for 1918-1939 from U. S. Bureau of Mines, with more recent years by The Oil Weekly with cooperation of state conservation officials and others. Completion data since 1923 from records of The Oil Weekly, earlier years from Bureau of Mines. Daily average production per well obtained by dividing daily average production of nation for year by average number of wells producing during year, that is, between January 1 and December 31.

Growing . . .
WITH THE SOUTHWEST

In 1934

Starting business in 1934 with two employees and one 14 x 30-foot building on a 50 x 100-foot lot was the small beginning of the Dallas Tank Company, Inc., twelve years ago.



In 1946—A 4½ Acre Plant—200 Employees

From 420 square feet of floor space to 40,000 square feet of floor space . . . from two employees to two hundred . . . all in the space of twelve busy, crowded years is the story, briefly told, of growing with Dallas. Today Dallas Tank Company, Inc., does a national business from coast to coast and border to border fabricating all types of welded sheet and steel plate products.

TANKS BY BANKS

DALLAS TANK *Company, Inc.*

201-5 WEST COMMERCE STREET • P. O. BOX 5387 • DALLAS, TEXAS

Crude-Oil Pipe-Line Mileage by States[1]

(From API "Facts and Figures")

STATE	CRUDE-OIL TRUNK LINES						CRUDE-OIL GATHERING LINES						TOTAL CRUDE-OIL PIPE LINES					
	1944	1943	1942	1941	1941[2]	1940	1944	1943	1942	1941	1941[2]	1940	1944	1943	1942	1941	1941[2]	1940
Arkansas	228	228	270	327	580	349	347	335	330	307	600	328	575	563	600	634	1,180	677
California					3,590						2,220						5,810	
Colorado	161	86	86	86	115	86	45	44	44		90		206	130	130	86	205	86
Illinois	4,467	4,455	4,459	4,385	4,280	4,070	2,048	2,035	1,892	1,737	1,850	1,051	6,515	6,490	6,351	6,122	6,130	5,121
Indiana	2,640	2,625	2,632	2,466	2,490	1,515	273	268	293	284	280	199	2,913	2,893	2,925	2,750	2,770	1,714
Iowa	103	103	103	103	95	96							103	103	103	103	95	96
Kansas	3,617	3,612	3,600	3,620	4,930	3,506	4,216	4,152	4,137	3,886	4,040	3,669	7,833	7,764	7,737	7,506	8,970	7,175
Kentucky	24	24	24	24	500	24	22	16			1,310	217	46	40	24	24	1,810	241
Louisiana	2,284	2,226	1,802	1,899	1,970	1,844	1,051	989	1,029	978	1,320	877	3,335	3,215	2,831	2,877	3,290	2,721
Maine	76	76	76	72									76	76	76	72		
Michigan	688	686	688	652	870	698	171	164	162	162	430	150	859	850	850	814	1,300	848
Mississippi	15						80	31	20	20	20	13	95	31	20	20	20	13
Missouri	4,761	4,746	4,756	4,728	4,610	4,463							4,761	4,746	4,756	4,728	4,610	4,463
Montana	160	76	53	53	140	26	252	241	246	215	350	144	412	317	299	268	490	170
Nebraska	385	385	386	386	380	386				16	10		385	385	386	402	390	386
New Hampshire	38	38	38	35									38	38	38	35		
New Jersey	141	269	269	175	110	176							141	269	269	175	110	176
New Mexico	344	344	342	544	450	560	1,011	988	938	731	900	675	1,355	1,332	1,280	1,275	1,350	1,235
New York	184	188	188	189	290	178	226	148	229	249	690	237	410	336	417	438	890	415
Ohio	2,937	2,937	2,945	2,804	2,630	3,084	3,338	3,374	3,395	4,940	4,940	4,590	6,275	6,311	6,340	6,297	7,570	7,674
Oklahoma	7,655	7,434	7,479	7,678	9,040	7,592	7,140	7,218	7,530	7,732	10,280	7,901	14,795	14,652	15,009	15,410	19,320	15,493
Pennsylvania	4,160	4,000	4,010	3,328	3,390	3,046	4,627	4,798	4,773	4,822	5,690	4,191	8,787	8,798	8,783	8,150	9,080	7,237
Texas	22,396	21,532	21,001	22,363	22,870	21,138	13,589	12,820	12,409	12,206	13,420	11,474	35,985	34,352	33,410	34,569	36,290	32,612
Utah	80	80	80	80	80	78							80	80	80	80	80	78
Vermont	59	59	59	59									59	59	59	59		
West Virginia	275	306	310	323	330	252	4,197	4,217	4,284	4,397	4,480	4,052	4,472	4,523	4,594	4,720	4,810	4,304
Wyoming	1,381	1,071	1,106	1,123	1,440	917	643	633	607	623	340	532	2,024	1,704	1,713	1,746	1,780	1,449
Total U.S.	59,259	57,586	56,762	57,502	65,180	54,084	43,276	42,471	42,318	41,858	53,170	40,300	102,535	100,057	99,080	99,360	118,350	94,384

[1] Reported by Interstate Commerce Commission, as of Dec. 31; does not include some purely intrastate and private pipe lines. First 1941 column is Bureau of Mines calculation of total pipe-line mileage, including private lines; this compilation indicates that ICC data covered, in 1941, approximately 85 percent of crude-oil trunk lines and 77 percent of gathering lines.
[2] Bureau of Mines, as of May 1, 1941, latest complete census available. See footnote 1.
Authority: Interstate Commerce Commission; Bureau of Mines.

U. S. Petroleum Pipe-Line Mileage,[1] By Years Since 1925

(As of December 31, 1945[2])

(From API "Facts and Figures")

YEAR	Crude-Oil Trunk Lines		Refined-Oil Trunk Lines		Total Trunk Lines		Crude-Oil Gathering Lines		Total Petroleum Pipe Lines[1]	
	ICC Lines[3]	All Lines[4]	ICC Lines[3]	All Lines[5]	ICC Lines[6]	All Lines[7]	ICC Lines[6]	All Lines[4]	ICC Lines[6]	All Lines[7]
1944	59,259	69,716	9,080	14,278	68,339	83,994	43,276	56,203	111,615	140,197
1943	57,586	67,748	8,726	12,181	66,312	79,929	42,471	55,157	108,783	135,086
1942	56,762	66,779	7,405	10,873	64,167	77,652	42,318	54,958	106,485	132,610
1941	57,502	67,649	6,075	9,903	63,577	77,552	41,858	54,361	105,435	131,913
1940	54,084	63,628	5,772	8,289	59,856	71,917	40,300	52,338	100,156	124,255
1939	53,641	61,500	5,467	5,922	59,108	68,800	39,573	53,700	98,681	122,500
1938	51,781	59,400	5,283	5,593	57,064	66,550	38,874	52,500	95,938	119,050
1937	51,375	58,900	5,175	5,065	56,550	65,350	40,062	53,800	96,612	119,150
1936	50,269	57,820*	4,142	4,458	54,411	63,220	39,515	52,760	93,926	115,980
1935		56,400			52,657	61,600	39,380	52,200	92,037	113,800
1934		58,400			53,405	63,150	39,665	52,100	93,070	115,250
1933		58,500			52,865	62,750	40,859	53,300	93,724	116,050
1932		57,500			51,404	61,650	41,378	53,500	92,782	115,150
1931		58,020*			51,287	62,070	41,803	53,640*	93,090	115,710
1930		55,200			45,922	56,250	42,806	54,400	88,728	110,650
1929		52,700			43,564	53,450	42,232	53,200	85,796	106,650
1928		48,500			39,422	48,750	42,254	52,700	81,676	101,450
1927		51,600			41,610	51,600	34,460	42,600	76,070	94,200
1926		44,470*			35,515	44,470	37,331	45,700	72,846	90,170

[1] Not including natural-gaosline pipe lines.
[2] Except as noted. See footnote 4.
[3] Breakdown of ICC trunk-line mileage between crude oil and refined oil is given as reported for 1938 on; estimated by API or 1937 and 1936 from ICC data and reports of companies. Not available prior to 1936.
[4] Believed to cover all petroleum pipe lines, including private carriers not reporting to ICC. Figures starred in these columns were reported by Bureau of Mines as of June 30, 1936; May 1, 1931, May 1, 1926, and spring of 1924. All other figures estimated, as of Dec. 31, by API from ICC data and trade sources. For May 1, 1941 the Bureau of Mines reported 65,180 miles of trunk lines, 53,170 miles of gathering lines, and 9,001 miles of gasoline lines.
[5] Totals shown are Bureau of Mines figures for total gasoline lines; mileage for other refined products believed small.
[6] Included only pipe lines reporting to the ICC. Figures for 1921 through 1944 are given as reported by ICC.
[7] Includes private carriers, and believed to cover almost all petroleum pipe lines. See footnotes 4 and 5.
Authority: Interstate Commerce Commission; Bureau of Mines; testimony before Temporary National Economic Committee; American Petroleum Institute.

Natural-Gas Pipe-Line Mileage, by States*

(As of January 1, 1946)

(From API "Facts and Figures")

STATE	1945	1944	1943	1942
Alabama	1,460	1,290	1,280	1,260
Arizona	1,570	680	680	660
Arkansas	3,790	3,660	3,660	3,470
California	26,000	25,680	25,500	25,200
Colorado	2,050	2,230	2,230	2,210
Florida	130	90	90	90
Georgia	1,900	1,590	1,580	1,550
Illinois	4,980	2,650	2,270	1,970
Indiana	3,720	2,950	2,950	1,910
Iowa	2,710	2,980	2,980	2,970
Kansas	13,100	11,780	11,690	11,550
Kentucky	4,990	3,350	3,270	3,240
Louisiana	7,000	3,540	3,400	3,390
Maryland	360	†	†	†
Michigan	9,980	8,800	4,410	4,330
Minnesota	1,020	980	940	920
Mississippi	3,110	1,660	1,570	1,560
Missouri	3,710	5,380	5,330	5,330
Montana	2,500	1,640	1,630	1,600
Nebraska	3,230	2,520	2,520	2,470
New Mexico	2,330	1,320	1,050	1,030
New York	8,090	3,850	3,750	3,170
North Dakota	420	430	430	430
Ohio	25,670	42,430	41,350	41,420
Oklahoma	12,210	11,000	11,000	10,860
Pennsylvania	24,090	21,550	21,550	21,130
South Dakota	600	290	280	280
Tennessee	1,160	1,320	1,300	1,290
Texas	28,160	32,740	32,320	31,660
Utah	990	1,100	980	1,000
Virginia	470	†	†	†
Washington				110
West Virginia	15,360	9,110	9,110	9,100
Wyoming	1,580	1,680	1,680	1,630
U. S. Total*	218,440	210,270	202,780	198,790

* Includes both transit and distribution lines.
† Ohio includes Maryland and Virginia.
Note: 1941 U.S. total was 195,130 miles.
Authority: American Gas Association

United States Production of Natural Gasoline and Allied Products

(All Figures in Barrels)

YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average	YEAR	Annual Production	Daily Average
1918	6,727,000	18,430	1925	26,845,000	73,547	1932	36,281,000	99,400	1939	51,650,000	141,507
1919	8,370,000	22,931	1926	32,455,000	88,917	1933	33,810,000	92,630	1940	55,700,000	152,502
1920	9,161,000	25,098	1927	39,075,000	107,054	1934	36,556,000	100,153	(*) Natural Gasoline and Allied Prod.		
1921	10,713,000	29,350	1928	43,191,000	118,331	1935	39,333,000	107,761	1941	80,855,000	221,520
1922	12,044,000	32,997	1929	53,183,000	145,706	1936	42,770,000	117,178	1942	83,322,000	228,279
1923	19,434,000	53,243	1930	52,631,000	144,194	1937	49,177,000	134,731	1943	87,716,000	240,318
1924	22,235,000	60,197	1931	43,617,000	119,498	1938	51,347,000	140,676	1944	100,046,000	273,350
									1945	109,500,000	300,000

* Bureau began a new series covering 1941 and subsequent years, which inculdes some cycle condensate.

BUILT FOR TOP PERFORMANCE

COFFING HOIST CO.

Coffing SAFETY-PULL Hoists

YEARS OF TOP PERFORMANCE IN THE OIL INDUSTRY HAVE RESULTED IN COFFING "SAFETY-PULL" RATCHET LEVER HOISTS BEING ACCEPTED AS STANDARD EQUIPMENT BY MANY OF THE LARGER PRODUCING AND REFINING COMPANIES. CAPACITIES RANGE FROM ¾ TO 15 TON. ADAPTABLE FOR ALL TYPES OF MAINTENANCE AND CONSTRUCTION WORK, ESPECIALLY FOR FIELD WORK WHERE HEAVY, CUMBERSOME HOISTS ARE INADEQUATE. "SAFETY-PULLS" WEIGH ONLY 14 TO 150 POUNDS AND ARE SOLD BY LEADING OIL WELL SUPPLY HOUSES. LISTED IN COMPOSITE AND REFINERY CATALOGS

Model F-G
1½ Tons
Weight 25 lbs.

CONTACT YOUR SUPPLIER OR WRITE FOR OUR NEW BULLETIN FORM Q-4

Model F-T-G,
Convertible
1 Chain 1½ Tons,
2 Chain 3 Tons

COFFING HOIST COMPANY
RATCHET LEVER HOISTS - SPUR GEAR HOISTS - ELECTRIC HOISTS
LOAD BINDERS - DIFFERENTIAL HOISTS - TROLLEYS
DANVILLE, ILLINOIS

Wells Completed by Oil Industry in United States in 1945, Compared with 1944

Figures for 1945 cover 52 weeks, ended December 29; those for 1944 covered 53 weeks, ended December 30 (one more week than normal)

NEW WELLS DRILLED FOR OIL OR GAS

STATE OR DISTRICT	PRODUCTIVE: In Fields Outposts and Wildcats; Oil 1944	Oil 1945	Gas 1944	Gas 1945	Distillate 1944	Distillate 1945	Total Productive 1944	Total Productive 1945	% Diff. Wkly.Av.	DRY HOLES: In Fields 1944	In Fields 1945	Outposts 1944	Outposts 1945	Wildcats 1944	Wildcats 1945	Total Dry 1944	Total Dry 1945	% Diff. Wkly.Av.	Total New For Oil or Gas 1944	Total New For Oil or Gas 1945	% Diff. Wkly.Av.
Alabama	11	14		1			11	15	+ 39.0	4	2	2		21	21	27	23	— 13.2	38	38	+ 1.9
Arizona														6		6			6		
Arkansas	135	118	7	5	2	2	144	125	— 11.8	20	31	1	1	66	41	87	73	— 14.6	231	198	— 12.6
California	1,673	1,699	37	45		2	1,710	1,746	+ 4.1	15	50	1	2	251	280	267	332	+ 26.6	1,977	2,078	+ 7.1
Colorado	19	39	1	3			20	42	+114.0	1				9	11	10	11	+ 12.1	30	53	+ 80.0
Florida		1						1			1			7	13	7	14	+103.8	7	15	+118.4
Georgia														8	6	8	6	— 23.5	8	6	— 23.5
Illinois	1,220	1,073	7				1,227	1,073	— 10.9	390	302			368	386	758	688	— 7.5	1,985	1,761	— 9.6
Indiana	148	118	23	28			171	146	— 13.0	85	89			70	87	155	176	+ 15.8	326	322	+ 0.7
Iowa														2	1	2	1	— 49.1	2	1	— 49.1
Kansas	857	811	75	181			932	992	+ 8.5	303	361	6		439	317	748	678	— 7.6	1,680	1,670	+ 1.3
Kentucky	394	331	104	77			498	408	— 16.5	290	152			120	90	310	242	— 20.5	808	650	— 18.0
Louisiana	412	599	65	82	15	46	492	727	+ 50.6	150	217	16	3	110	132	276	352	+ 29.9	768	1,079	+ 43.2
North Louisiana	97	213	53	70	10	13	160	296	+ 88.4	42	76	12	2	69	82	123	160	+ 32.8	283	456	+ 64.2
South Louisiana	315	386	12	12	5	33	332	431	+ 32.4	108	141	4	1	41	50	153	192	+ 27.7	485	623	+ 30.9
Michigan	265	291	59	49			324	340	+ 7.0	144	176	2	9	213	234	2359	419	+ 19.1	683	759	+ 13.3
Mississippi	112	191	4	3	1	8	117	202	+ 75.6	9	45	11		75	121	95	166	+ 78.2	212	368	+ 77.0
Missouri	24	4	7	10			31	14	— 54.0	9	10			11	20	20	30	+ 52.9	51	44	— 12.1
Montana	199	173	23	17			222	190	— 12.9	64	29	3		37	16	104	45	— 55.6	326	235	— 26.5
Nebraska	4						4			2	1			11	4	13	5	— 60.8	17	5	— 70.0
New Mexico	277	277	15	15			292	292	+ 2.0	64	65		1	60	65	124	131	+ 7.7	416	423	+ 3.6
New York	788	723	2	3			790	726	— 6.4	13	4					13	4	— 68.6	803	730	— 7.3
North Carolina															1		1			1	
Ohio	210	248	423	352			633	600	— 3.4	300	349			76	66	376	415	+ 12.6	1,009	1,015	+ 2.5
Oklahoma	1,106	1,370	135	125	2	2	1,243	1,497	+ 22.8	320	464	3		241	299	564	763	+ 37.9	1,807	2,260	+ 27.5
Pennsylvania	1,410	1,400	306	232			1,716	1,632	— 3.1	75	52					75	52	— 29.6	1,791	1,684	— 4.2
South Dakota															1		1			1	
Tennessee	2		1				3			2				4	4	6	4	— 32.1	9	4	— 54.7
Texas	3,598	4,025	251	699	34	93	3,883	4,817	+ 26.4	962	1,203	23	17	1,200	1,203	2,185	2,427	+ 13.0	6,068	7,240	+ 21.6
East Texas Border Co.'s	5	2	12	92	3	10	20	104	+429.9	1	5			14	19	15	24	+ 63.1	35	128	+272.7
Rest of Eastern Texas	123	145	10	13	7	3	140	161	+ 17.4	30	34	1	2	107	66	138	102	— 24.6	278	263	— 3.6
North Texas	692	967	8	15	1		701	982	+ 42.7	364	507		2	287	305	651	814	+ 27.4	1,352	1,796	+ 35.4
West Central Texas	162	199	9	48			171	247	+ 47.1	108	101	2		117	123	227	224	+ 0.7	398	471	+ 20.6
West Texas	1,306	1,289	14	24			1,320	1,313	+ 1.4	94	167	6	8	171	192	271	367	+ 38.2	1,591	1,680	+ 7.6
Texas Panhandle	236	179	51	341			287	520	+ 84.5	36	32			6	9	42	41	— 0.5	329	561	+ 73.8
Gulf Coast, Upper	308	353	48	43	12	41	358	437	+ 24.4	99	124	4	3	130	141	233	268	+ 17.0	601	705	+ 19.6
Gulf Coast, Lower	545	645	76	88	8	37	629	770	+ 24.8	121	120	7		167	178	295	298	+ 2.9	924	1,068	+ 17.8
Southwest Texas	191	220	22	32	2	2	215	254	+ 20.2	96	101	3	1	142	118	241	220	— 7.0	456	474	+ 6.0
South Central Texas	30	26	1	3	1		32	29	— 7.6	13	12		1	59	52	72	65	— 8.1	104	94	— 7.7
Utah														1		1			1		
Washington															1		1			1	
West Virginia	89	86	755	552			844	638	— 22.9	127	129			2		129	129	+ 2.1	973	767	— 19.7
Wyoming	142	147	2	5	5		149	152	+ 3.9	4	14	5	3	17	24	26	41	+ 61.2	175	193	+ 12.4
Total United States	13,095	13,728	2,302	2,484	59	153	15,456	16,375	+ 8.0	3,253	3,746	73	36	3,425	3,444	6,751	7,226	+ 9.1	22,207	23,601	+ 8.3

CONTINUED FROM ABOVE

STATE OR DISTRICT	OTHER NEW WELLS: Water Input 1944	Water Input 1945	Gas Input 1944	Gas Input 1945	Salt Water Disposal 1944	Salt Water Disposal 1945	TOTAL NEW WELLS 1944	TOTAL NEW WELLS 1945	% Diff. Wkly.Av	OLD WELLS DRILLED DEEPER: Oil 1944	Oil 1945	Gas 1944	Gas 1945	Dry 1944	Dry 1945	Total 1944	Total 1945	% Diff. Wkly.Av.	TOTAL ALL WELLS 1944	TOTAL ALL WELLS 1945	% Diff. Wkly.Av.
Alabama							38	38	+ 1.9										38	38	+ 1.9
Arizona							6												6		
Arkansas							231	198	— 12.6		2			2		2	2	+ 2.1	233	200	— 12.5
California							1,977	2,078	+ 7.1	63	11			3	1	66	12	— 81.6	2,043	2,090	+ 4.3
Colorado							30	53	+ 80.1										30	53	+ 80.1
Florida							7	15	+118.4										7	15	+118.4
Georgia							8	6	— 23.5										8	6	— 23.5
Illinois	1	2	5	1	5	14	1,996	1,778	— 9.2	67	118			3	12	70	130	+ 89.4	2,066	1,908	— 5.9
Indiana							326	322	+ 0.7	3	7	1	1	5	2	9	10	+ 13.3	335	332	+ 0.9
Iowa							2	1	— 49.1										2	1	— 49.1
Kansas	3				23	13	1,706	1,683	+ 0.6	12	40			7	34	19	74	+294.4	1,725	1,757	+ 3.8
Kentucky	3	1			1		812	651	— 18.3	9	5			5	2	14	7	— 49.1	826	658	— 18.8
Louisiana		1	4			1	772	1,081	+ 42.7	4	4			2	2	6	6	+ 1.1	778	1,087	+ 42.4
North Louisiana			1			1	284	457	+ 64.0		1			2	1	2	2	+ 2.1	286	459	+ 63.5
South Louisiana		1	3				488	624	+ 30.3	4	3				1	4	4	+ 1.9	492	628	+ 30.2
Michigan				2			683	761	+ 13.5		1			5	1	5	2	— 59.2	688	763	+ 13.0
Mississippi					1		213	368	+ 76.1		1						1		213	369	+ 76.6
Missouri	10						61	44	— 26.1						4		4		61	48	— 20.0
Montana	9					2	335	237	— 27.8		1						1		335	238	— 27.5
Nebraska							17	5	— 70.0					1		1			18	5	— 71.7
New Mexico							416	423	+ 3.6	2	1			4	1	6	2	— 66.0	422	425	+ 2.6
New York	446	408					1,249	1,138	— 7.2										1,249	1,138	— 7.2
North Carolina								1												1	
Ohio	12	5		1	2		1,023	1,021	+ 1.7	1					2	1	2	+103.7	1,023	1,023	+ 1.9
Oklahoma	19	5	20	22	15	9	1,861	2,296	+ 25.7	20	36	3	5	7	14	30	55	+ 86.0	1,891	2,351	+ 26.7
Pennsylvania	1,268	1,227					3,059	2,911	— 3.0	1	1		16		1	1	18	+731.7	3,060	2,929	— 2.4
South Dakota								1												1	
Tennessee							9	4	— 54.7										9	4	— 54.7
Texas	12	14	9	19	4	5	6,093	7,278	+ 21.7	96	95	3	7	43	29	142	131	— 6.0	6,235	7,409	+ 21.1
East Texas Border Co.'s							35	128	+272.7										35	128	+272.7
East Texas Field					1		1							3		3			4		
Rest of Eastern Texas							278	263	— 3.6		3			2	2	2	5	+155.2	280	268	— 2.5
North Texas	12	13	6	17	3	4	1,373	1,830	+ 35.8	24	12			18	8	42	20	— 51.9	1,415	1,850	+ 33.3
West Central Texas			2				400	471	+ 20.0	13	5	2	2	4	4	19	11	— 41.7	419	482	+ 17.2
West Texas							1,591	1,680	+ 7.6	45	42			12	10	57	52	— 7.4	1,648	1,732	+ 7.1
Texas Panhandle							329	561	+ 73.8	2	22		2	1	3	3	27	+817.3	332	588	+ 80.7
Gulf Coast, Upper		1	1				602	706	+ 19.5	9	5	1	1		1	10	7	— 28.7	612	713	+ 18.7
Gulf Coast, Lower				2			924	1,070	+ 18.1	2	4		2	1	1	3	7	+137.8	927	1,077	+ 18.4
Southwest Texas							456	474	+ 6.0	1	2			1		2	2	+ 2.1	458	476	+ 5.9
South Central Texas						1	104	95	— 6.6					1		1			105	95	— 7.6
Utah							1												1		
Washington								1												1	
West Virginia				1			973	768	— 19.6		3	2	30		2	2	35	+685.4	975	803	— 16.1
Wyoming	1						176	193	+ 11.7	1						1			177	193	+ 11.1
Total United States	1,784	1,663	38	46	51	44	24,080	25,354	+ 7.3	279	326	9	59	87	107	375	492	+ 33.6	24,455	25,846	+ 7.7

Specialists In

PIPE LINE CON

We have only one business... producing "The Best in Pipe Line Construction." This statement is backed by 28 years of practical experience in engineering and laying the major sections of the world's greatest pipe lines . . . both domestic and foreign. With our modern equipment, skilled personnel, and a vast resource of trained engineering knowledge, we are ready to undertake your job, regardless of location. Let us construct your next pipe line.

Powerful bulldozers clear the land preparatory to ditching.

Newest, most efficient ditchers speed up operations.

Modern engineering required the line the Oklahoma

OKLAHOMA CONTRACTOR

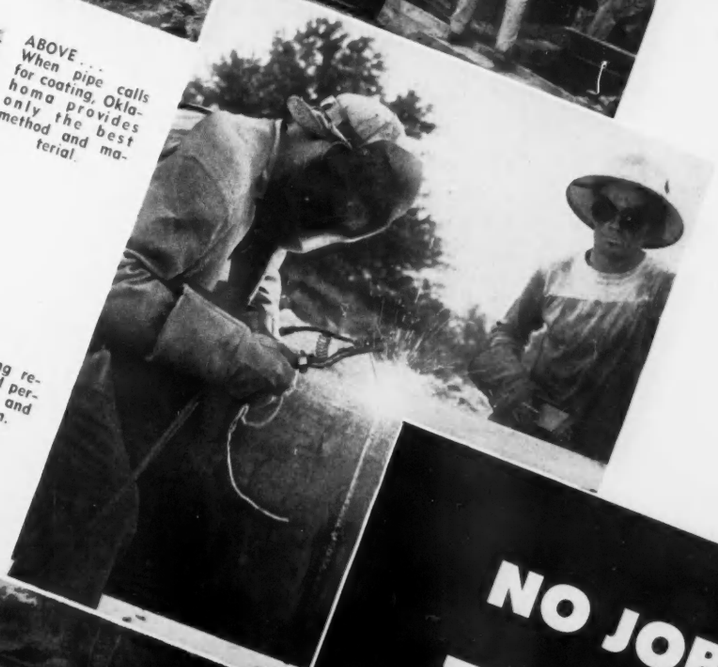
DALLAS, TEXAS

NSTRUCTION

"A Good Job," you'll say, upon completion and for years after if Oklahoma does it!

Modern equipment, engineering skill is required to lay pipe line the way Oklahoma does.

ABOVE . . . When pipe calls for coating, Oklahoma provides only the best method and material.



RIGHT . . . Good welding requires skilled personnel . . . and we have 'em.

Water crossings are only typical of many obstacles satisfactorily overcome by Oklahoma.

NO JOB TOO BIG OR TOO DIFFICULT

ACTING COMPANY

SOUTH AMERICA, APARTADO 1085 • CARACAS, VENEZUELA

Results of Exploratory Drilling in the United States in 1945, by States, and Comparison with Earlier Years

(Based on Data Compiled by the Staff of The Oil Weekly)

PART 1: Productive Tests

State or District	OIL									DISTILLATE									GAS									TOTAL PRODUCTIVE		
	New Fields			New Pays			Extensions			New Fields			New Pays			Extensions			New Fields			New Pays			Extensions					
	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth	No.	Footage	Avg. Depth
Alabama	1	3,461	3461	..			..			..			..			..			1	2,004	2004	..			..			2	5,465	2732
Arizona	..			..			..			..			..			..			..			..			..			..		
Arkansas	1	2,954	2954	1	6,350	6350	..			..			..			..			..			..			..			2	9,304	4652
California	4	10,240	2560	4	22,163	5541	4	28,488	7122	..			..			..			1	4,840	4840	..			2	8,723	4362	15	74,454	4964
Colorado	..			..			5	30,185	6037	..			..			..			..			..			..			5	30,185	6037
Florida	..			..			..			..			..			..			..			..			..			..		
Georgia	..			..			..			..			..			..			..			..			..			..		
Illinois	28	77,791	2778	26	75,681	2911	49	136,980	2795	..			..			..			..			..			..			103	290,452	2820
Indiana	5	10,881	2176	2	5,355	2678	2	2,294	1147	..			..			..			3	2,297	766	..			..			12	20,827	1736
Iowa	..			..			..			..			..			..			..			..			..			..		
Kansas	44	152,368	3463	11	37,610	3419	20	70,663	3513	..			..			..			14	57,689	4121	..			5	17,573	3515	94	335,903	3573
Kentucky	8	13,551	1694	1	2,551	2551	2	3,972	1986	..			..			..			1	1,934	1934	..			..			12	22,008	1834
Louisiana	23	194,635	8462	20	201,284	10064	5	43,405	8681	3	32,390	10797	6	67,237	11206	2	19,721	9861	6	34,199	5700	..			1	6,782	6782	66	599,653	9086
North Louisiana	8	43,351	5419	2	13,838	6919	3	21,148	7049	1	9,137	9137	..			1	9,307	9307	6	34,199	5700	..			1	6,782	6782	22	137,762	6262
South Louisiana	15	151,284	10086	18	187,446	10414	2	22,257	11128	2	23,253	11626	6	67,237	11206	1	10,414	10414	..			..			..			44	461,891	10497
Michigan	16	46,469	2904	4	17,890	4473	1	1,661	1661	..			..			..			7	10,032	1433	3	4,620	1540	..			31	80,672	2602
Mississippi	2	15,107	7554	..			6	53,498	8916	2	21,703	10852	..			..			1	8,153	8153	..			..			11	98,461	8951
Missouri	..			..			..			..			..			..			..			..			..			..		
Montana	4	11,197	2799	2	4,482	2241	1	3,064	3064	..			..			..			1	3,221	3221	..			..			8	21,964	2746
Nebraska	..			..			..			..			..			..			..			..			..			..		
New Mexico	3	13,806	4602	6	42,932	7155	3	18,523	6174	..			..			..			1	933	933	3	18,240	6080	..			16	94,434	5902
Ohio	..			1	3,251	3251	2	7,369	3685	..			..			..			15	49,091	3273	1	2,034	2094	9	31,729	3525	28	93,534	3341
Oklahoma	59	253,156	4291	10	42,974	4297	16	77,883	4868	3	24,845	8282	..			..			18	60,657	3370	3	19,429	6476	2	5,145	2573	111	484,089	4361
Oregon	..			..			..			..			..			..			..			..			..			..		
Tennessee	..			..			..			..			..			..			..			..			..			..		
Texas	113	672,911	5955	65	404,319	6220	31	184,861	5963	22	199,977	8681	8	73,227	9153	4	34,441	8610	35	201,489	5757	4	19,778	4945	1	7,013	7013	283	1,789,016	6322
E. Texas Border	1	7,500	7500	..			..			3	21,672	7224	..			..			6	42,255	7043	..			..			10	71,427	7143
Rest of E. Texas	2	18,146	9073	2	15,070	7535	..			1	7,589	7589	3	24,766	8255	..			2	16,953	8027	1	8,292	8292	..			11	89,916	8174
North Texas	31	127,240	4105	18	90,712	5040	5	28,951	5790	..			..			..			1	912	912	1	608	608	..			56	248,423	4436
West Central Texas	15	47,934	3196	7	23,379	3340	..			..			..			..			5	14,396	2879	..			..			27	85,709	3174
West Texas	24	181,691	7570	13	112,267	8636	18	98,212	5456	..			..			..			..			..			..			55	392,170	7139
Texas Panhandle	..			..			..			..			..			..			..			..			..			..		
Gulf Coast, Upper	16	132,006	8250	17	118,656	6980	6	46,383	7731	9	86,275	9586	1	11,820	11820	4	34,441	8610	6	35,020	5837	..			..			59	464,601	7875
Gulf Coast, Lower	18	130,710	7262	4	26,313	6578	1	6,795	6795	8	70,508	8814	4	36,641	9160	..			10	69,443	6944	2	10,878	5439	1	7,013	7013	48	358,301	7465
Southwest Texas	4	17,427	4357	4	17,922	4481	1	4,520	4520	1	4,933	4933	..			..			2	5,469	2739	..			..			12	59,262	4189
South Central Texas	2	10,257	5128	..			..			..			..			..			3	17,959	5983	..			..			5	28,207	5641
Utah	..			..			..			..			..			..			..			..			..			..		
Washington	..			..			..			..			..			..			..			..			..			..		
West Virginia	..			..			..			..			..			..			..			..			..			..		
Wyoming	4	19,866	4967	5	27,846	5569	7	39,976	5711	..			..			..			2	11,751	5876	1	3,294	3294	..			19	102,733	5407
U.S. Total, 1945	315	1,498,393	4757	158	894,688	5663	154	702,822	4564	30	269,915	8997	14	140,461	10033	6	54,162	9027	106	448,290	4229	15	67,155	4197	20	76,965	3848	818	4,153,154	5077
U. S. Total, Earlier Years—																														
1944	326	1,422,250	4363	149	731,764	4911	1235	659,987	4889	32	250,228	7820	9	75,436	8382	10	79,797	7980	102	417,944	4097	15	95,099	6340	27	111,174	4118	805	3,843,679	4775
1943	276	1,232,391	4465	127	565,454	4452	132	559,090	4236	15	140,564	9371	9	88,031	9781	3	25,589	8530	56	212,814	3890	16	90,372	5648	10	58,996	5900	644	2,973,301	4617
1942	288	1,199,382	4165	163	879,116	5393	..			13	121,620	9355	2	13,517	6759	..			47	167,428	3562	10	50,712	5071	..			523	2,431,775	4650
1941	301	1,165,966	3874	261	1,335,648	5117	..			3	23,505	7835	2	7,109	3555	..			58	177,974	3069	25	89,263	3571	..			650	2,799,465	4307
1940	261	957,167	3667	167	914,442	5476	..			2	12,792	6396	..			..			46	122,439	2662	16	55,983	3499	..			492	2,062,823	4193
1939	224	782,289	3492	190	998,595	5256	..			1	7,999	7999	3	24,709	8236	..			33	103,450	3135	22	92,626	4210	..			473	2,039,668	4249
1938	229	944,455	4124	144	815,186	5661	7	25,027	3575	4	23,657	5914	4	27,115	6779	..			31	102,440	3305	11	49,634	4512	3	12,042	4014	433	1,999,556	4618
1937	203	831,123	4094	119	615,007	5168	3	9,036	3012	3	19,377	6459	3	24,574	8191	..			33	77,389	2345	15	51,145	3410	..			379	1,627,651	4295

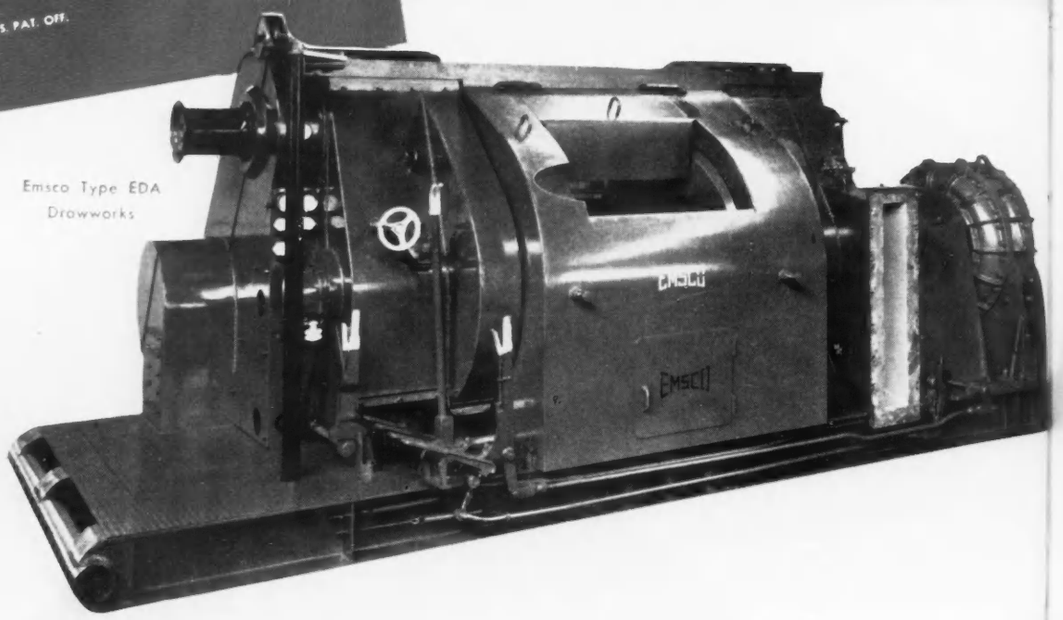
PART 2: Unproductive Tests and Total Exploratory Tests

STATE OR DISTRICT	DRY WILDCATS			DRY NEW PAY TESTS			DRY OUTPOSTS			TOTAL DRY			TOTAL EXPLORATORY TESTS		
	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth	No.	Footage	Average Depth
Alabama	21	95,511	4548	....	.....	....	....	.....	....	21	95,511	4548	23	100,976	4390
Arizona	....	.....	....	....	.....	....	....	.....	....	....	.....	....	....	.....	....
Arkansas	41	185,427	4523	1	7,870	7870	1	6,650	6650	43	199,947	4650	45	209,251	4650
California	280	1,336,908	4775	....	.....	....	2	12,903	6452	282	1,349,811	4787	297	1,424,265	4796
Colorado	11	64,574	5870	....	.....	....	....	.....	....	11	64,574	5870	16	94,759	5922
Florida	13	75,004	5770	....	.....	....	....	.....	....	13	75,004	5770	13	75,004	5770
Georgia	6	19,502	3250	....	.....	....	....	.....	....	6	19,502	3250	6	19,502	3250
Illinois	386	982,214	2545	....	.....	....	....	.....	....	386	982,214	2545	489	1,272,666	2603
Indiana	87	163,134	1875	....	.....	....	....	.....	....	87	163,134	1875	99	183,961	1858
Iowa	1	1,250	1250	....	.....	....	....	.....	....	1	1,250	1250	1	1.250	1250
Kansas	317	1,156,753	3649	....	.....	....	....	.....	....	317	1,156,753	3649	411	1,492,656	3632
Kentucky	90	180,819	2009	....	.....	....	....	.....	....	90	180,819	2009	102	202,827	1989
Louisiana	132	922,395	6988	....	.....	....	3	15,159	5053	135	937,554	6945	201	1,537,207	7648
North Louisiana	82	423,496	5165	....	.....	....	2	6,800	3400	84	430,296	5123	106	568,058	5359
South Louisiana	50	498,899	9978	....	.....	....	1	8,359	8359	51	507,258	9946	95	969,149	10202
Michigan	234	617,942	641	3	12,035	4012	9	27,069	3008	246	657,046	2671	277	737,718	2663
Mississippi	121	854,253	7060	....	.....	....	....	.....	....	121	854,253	7060	132	952,714	7218
Missouri	20	27,165	1358	....	.....	....	....	.....	....	20	27,165	1358	20	27,165	1358
Montana	16	56,090	3506	....	.....	....	....	.....	....	16	56,090	3506	24	78,054	3252
Nebraska	4	14,262	3566	....	.....	....	....	.....	....	4	14,262	3566	4	14,262	3566
New Mexico	65	248,664	3826	2	12,900	6450	1	7,044	7044	68	268,608	3950	84	363,042	4322
North Carolina	1	4,044	4044	....	.....	....	....	.....	....	1	4,044	4044	1	4,044	4044
Ohio	66	243,011	3682	....	.....	....	....	.....	....	66	243,011	3682	94	336,545	3580
Oklahoma	299	1,337,128	4472	....	.....	....	....	.....	....	299	1,337,128	4472	410	1,821,217	4442
South Dakota	1	4,950	4950	....	.....	....	....	.....	....	1	4,950	4950	1	4,950	4950
Tennessee	4	4,923	1231	....	.....	....	....	.....	....	4	4,923	1231	4	4,923	1231
Texas	1,203	5,649,557	4696	33	251,636	7625	17	105,107	6183	1,253	6,006,300	4793	1,536	7,795,316	5075
East Texas Border	19	123,846	6518	....	.....	....	....	.....	....	19	123,846	6518	29	195,273	6734
Rest of Eastern Texas	66	346,881	5256	4	37,123	9281	2	16,659	8330	72	400,663	5565	83	490,579	5911
North Texas	305	853,725	2799	7	30,011	4287	2	12,732	6366	314	896,468	2855	370	1,144,891	3094
West Central Texas	123	359,977	2927	4	16,315	4079	....	.....	....	127	376,292	2963	154	462.001	3000
West Texas	192	1,045,270	5444	13	115,418	8878	8	41,445	5181	213	1,202,133	5644	268	1,594,303	5949
Texas Panhandle	9	47,181	5242	1	6,709	6709	....	.....	....	10	53,890	5389	10	53,890	5389
Gulf Coast, Upper	141	1,071,398	7599	4	46,060	11515	3	27,314	9105	148	1,144,772	7735	207	1,609,373	7775
Gulf Coast, Lower	178	1,103,060	6197	....	.....	....	....	.....	....	178	1,103,060	6197	226	1,461,361	6166
Southwest Texas	118	498,425	4224	....	.....	....	1	4,109	4109	119	502,534	4223	131	552,796	4220
South Central Texas	52	199,794	3842	....	.....	....	1	2,848	2848	53	202,642	3823	58	230,849	3980
Utah	....	.....	....	....	.....	....	....	.....	....	....	.....	....	....	.....	....
Washington	1	3,200	3200	....	.....	....	....	.....	....	1	3,200	3200	1	3,200	3200
West Virginia	....	.....	....	....	.....	....	....	.....	....	....	.....	....	....	.....	....
Wyoming	24	93,118	3880	....	.....	....	3	9,768	3256	27	102,886	3811	46	205,619	4470
United States Total, 1945	**3,444**	**14,341,798**	**4164**	**39**	**284.441**	**7293**	**36**	**183,700**	**5103**	**3,519**	**14,809,939**	**4209**	**4,337**	**18,963,093**	**4372**
U. S. Total, Earlier Years															
1944	3,424	13,463,808	3932	22	141,039	6411	73	383,802	5258	3,519	13,988,649	3975	4,324	17,832,328	4124
1943	2,932	10,647,778	3632	....	.....	....	36	164,155	4560	2,968	10,811,933	3643	3,643	13,785,234	3817
1942	2,643	9,288,828	3515	....	.....	....	....	.....	....	2,643	9,288,828	3515	3,166	11,720.603	3702
1941	3,047	9,651,013	3167	....	.....	....	....	.....	....	3,047	9,651,013	3167	3,697	12 450,478	3368
1940	2,672	8,649,828	3237	....	.....	....	....	.....	....	2,672	8,649,828	3237	3,164	10,712,651	3386
1939	2,488	7,764,816	3121	....	.....	....	....	.....	....	2,488	7,764,816	3121	2,961	9,774,484	3301
1938	2,179	7,012,901	3218	....	.....	....	....	.....	....	2,179	7,012,901	3218	2,612	9,012,457	3450
1937	1,943	7,173,550	3692	....	.....	....	....	.....	....	1,943	7,173,550	3692	2,322	8.801.201	3790

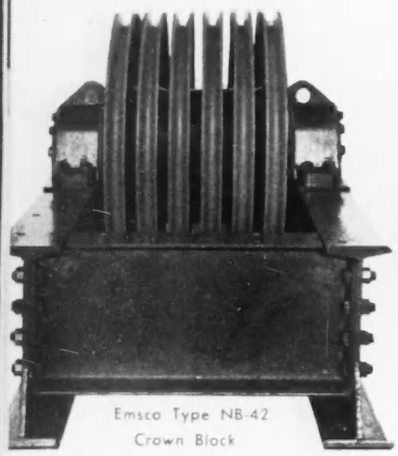
EMSCO

REG. U. S. PAT. OFF.

DRILLING EQUIPMENT



Emsco Type EDA
Drawworks



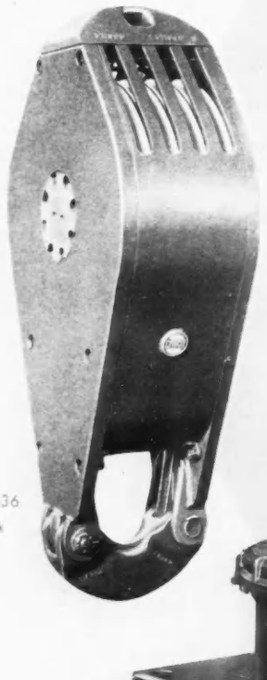
Emsco Type NB-42
Crown Block

LATEST DEVELOPMENTS

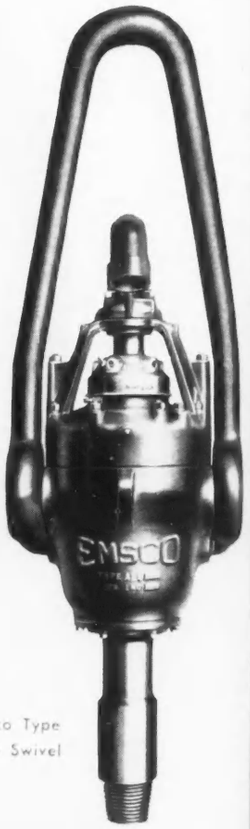
▲ Emsco engineers are constantly effecting improvements in the Emsco line of drilling equipment. The demands of the industry are the dictating factors in new features introduced.

▲ Shown here are some of the latest developments in Emsco products. These, along with others in the extensive and well-rounded Emsco line, offer you the correct equipment for any job . . . from individual items to complete rigs.

▲ Ask your Continental man for complete details.



Emsco Type NB-36
Traveling Block



Emsco Type
AE-6 Swivel

Emsco Type N-15
Rotary Table

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

THE CONTINENTAL SUPPLY COMPANY, ***General Offices:*** **DALLAS, TEXAS • EXPORT DIVISION:** ***30 Rockefeller Plaza,*** **NEW YORK, N. Y.**
Representatives: **ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ENGLAND • JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA**

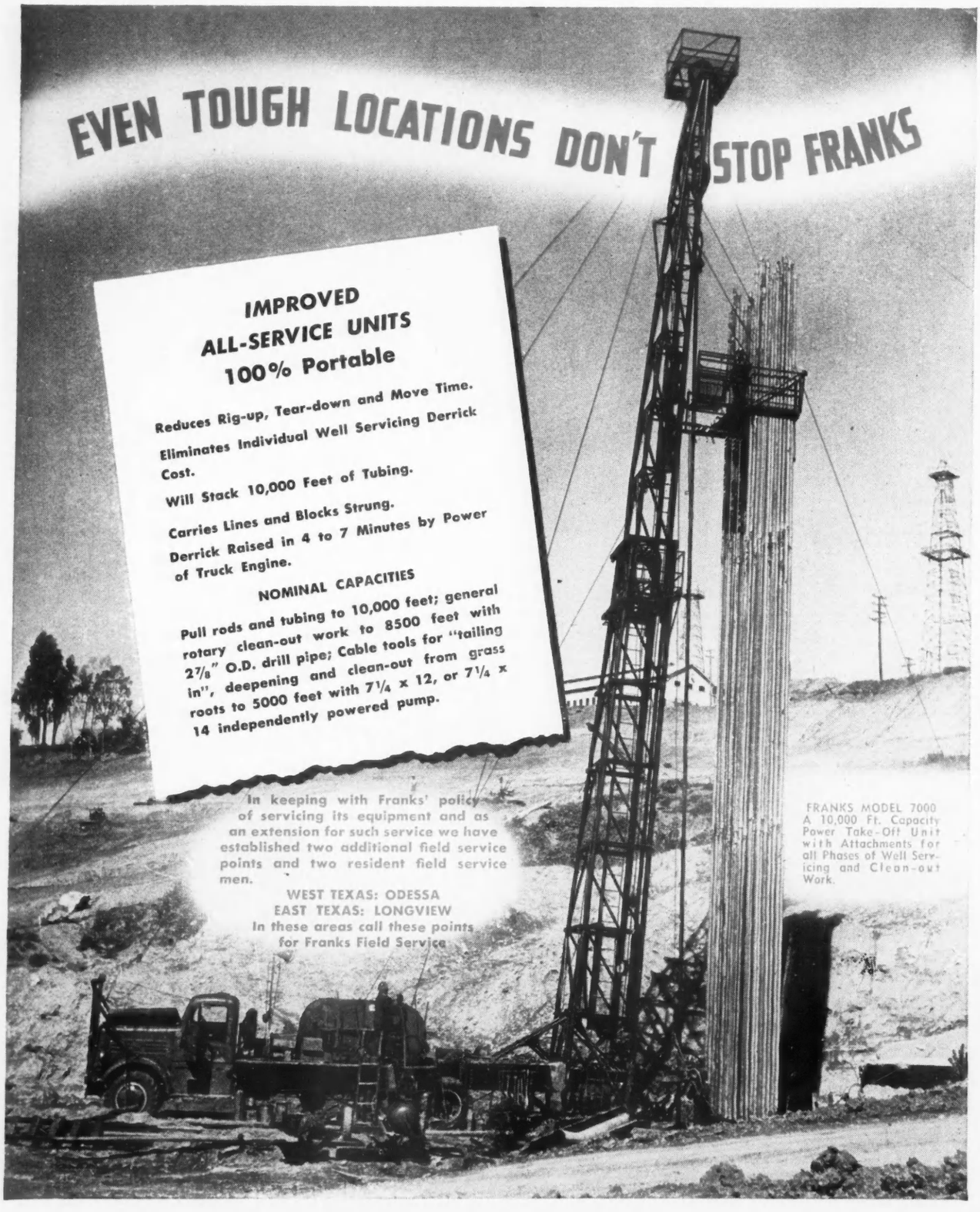
Footage and Average Depths Drilled in All Wells in the United States in 1945

STATE OR DISTRICT	OIL			GAS			DISTILLATE			DRY (All Except Old Wells Drilled Deeper)			WATER INPUT			GAS INPUT		
	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth
Alabama	14	47,287	3378	1	2,004	2004	.....	.....	.....	23	101,797	4426	.....	.....	.....	.....	.....	.....
Arizona	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas	118	496,567	4208	5	16,524	3305	2	17,343	8672	73	334,217	4578	.....	.....	.....	.....	.....	.....
California	1699	6,780,816	3991	45	236,234	5250	2	21,849	10925	332	1,553,499	4679	.....	.....	.....	.....	.....	.....
Colorado	39	245,719	6300	3	13,199	4399	.....	.....	.....	11	64,574	5870	.....	.....	.....	.....	.....	.....
Florida	1	11,549	11549	.....	.....	.....	.....	.....	.....	14	86,846	6203	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	19,502	3250	.....	.....	.....	.....	.....	.....
Illinois	1073	2,782,634	2593	.....	.....	.....	.....	.....	.....	688	1,784,328	2594	2	987	494	1	436	436
Indiana	118	187,013	1585	28	24,490	875	.....	.....	.....	176	301,467	1713	.....	.....	.....	.....	.....	.....
Iowa	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1,250	1250	.....	.....	.....	.....	.....	.....
Kansas	811	2,591,390	3195	181	545,148	3012	.....	.....	.....	678	2,336,281	3446	.....	.....	.....	.....	.....	.....
Kentucky	331	538,988	1628	77	176,945	2298	.....	.....	.....	242	441,269	1823	1	935	935	.....	.....	.....
Louisiana	599	4,486,650	7490	82	362,007	4415	46	431,719	9385	352	2,492,487	7081	1	9,797	9797	.....	.....	.....
North Louisiana	213	1,011,195	4747	70	257,564	3679	13	102,168	7859	160	714,990	4469	.....	.....	.....	.....	.....	.....
South Louisiana	386	3,475,455	9004	12	104,433	8703	33	329,551	9986	192	1,777,497	9258	1	9,797	9797	.....	.....	.....
Michigan	291	856,262	2942	49	76,964	1571	.....	.....	.....	419	1,032,781	2465	.....	.....	.....	2	2,750	1375
Mississippi	191	1,191,749	6239	3	29,119	9706	8	66,944	8368	166	1,152,903	6945	.....	.....	.....	.....	.....	.....
Missouri	4	978	244	10	3,520	352	.....	.....	.....	30	44,396	1480	.....	.....	.....	.....	.....	.....
Montana	173	429,635	2483	17	32,964	1939	.....	.....	.....	45	121,519	2700	.....	.....	.....	.....	.....	.....
Nebraska	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	16,800	3360	.....	.....	.....	.....	.....	.....
New Mexico	277	1,017,293	3672	15	55,027	3668	.....	.....	.....	131	472,903	3610	.....	.....	.....	.....	.....	.....
New York	723	1,015,667	1405	3	11,600	3867	.....	.....	.....	4	18,221	4555	408	544,680	1335	.....	.....	.....
North Carolina	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4,044	4044	.....	.....	.....	.....	.....	.....
Ohio	248	591,660	2386	352	858,645	2439	.....	.....	.....	415	1,125,951	2713	5	2,023	405	1	3,325	3325
Oklahoma	1370	5,916,237	4318	125	405,632	3240	2	18,995	9498	763	2,848,540	3733	5	13,217	2643	22	44,463	2021
Pennsylvania	1400	2,254,496	1610	232	652,041	2811	.....	.....	.....	52	159,310	3064	1227	1,963,200	1600	.....	.....	.....
South Dakota	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	4,950	4950	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	8,630	2158	.....	.....	.....	.....	.....	.....
Texas	4025	18,626,952	4628	699	2,948,338	4218	93	757,968	8150	2423	10,240,811	4227	14	22,346	1596	19	32,013	1685
E. Texas Border Co.'s	2	15,672	7836	92	595,884	6477	10	67,211	6721	24	148,667	6194	.....	.....	.....	.....	.....	.....
East Texas Field	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rest of East Texas	145	906,328	6251	13	81,219	6248	3	23,642	7881	102	578,479	5671	.....	.....	.....	.....	.....	.....
North Texas	967	2,480,921	2566	15	55,469	3698	.....	.....	.....	814	1,984,514	2438	13	9,354	720	17	19,080	1122
West Central Texas	199	532,189	2674	48	145,336	3028	.....	.....	.....	224	620,773	2771	.....	.....	.....	.....	.....	.....
West Texas	1289	6,439,343	4996	24	84,173	3507	.....	.....	.....	367	1,764,442	4808	.....	.....	.....	.....	.....	.....
Texas Panhandle	179	552,106	3084	341	1,035,452	3037	.....	.....	.....	41	186,726	4554	.....	.....	.....	.....	.....	.....
Gulf Coast, Upper	353	2,538,720	7192	43	284,551	6617	41	385,859	9411	268	1,950,496	7278	1	12,992	12992	.....	.....	.....
Gulf Coast, Lower	645	4,122,767	6392	88	531,082	6035	37	272,083	7354	298	1,876,838	6298	.....	.....	.....	2	12,933	6466
Southwest Texas	220	877,659	3989	32	120,213	3757	2	9,173	4587	220	871,766	3963	.....	.....	.....	.....	.....	.....
South Central Texas	26	161,247	6202	3	14,959	4986	.....	.....	.....	65	258,110	3971	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3,200	3200	.....	.....	.....	.....	.....	.....
West Virginia	86	191,382	2225	552	1,517,218	2749	.....	.....	.....	129	354,404	2747	.....	.....	.....	1	1,450	1450
Wyoming	147	694,883	4727	5	18,019	3604	.....	.....	.....	41	162,384	3961	.....	.....	.....	.....	.....	.....
Total United States	13,738	50,955,807	3709	2484	7,985,028	3215	153	1,314,818	8594	7226	27,289,164	3777	1663	2,557,185	1538	46	84,437	1836

(Continued from above)

STATE OR DIST.	SALT WATER DISPOSAL			TOTAL NEW WELLS (Preceding Classes) 1945			TOTAL NEW WELLS (Preceding Classes) 1944			OLD WELLS DRILLED DEEPER, 1945 (Productive and Dry)			TOTAL ALL WELLS 1945			TOTAL ALL WELLS 1944		
	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth	Wells	Footage	Average Depth
Alabama	.....	.....	.....	38	151,088	3976	38	188,622	4964	.....	.....	.....	38	151,088	3976	38	188,622	4963
Arizona	.....	.....	.....	.....	.....	.....	6	16,190	2698	.....	.....	.....	.....	.....	.....	6	16,190	2698
Arkansas	.....	.....	.....	198	864,651	4367	231	1,315,228	5694	2	180	90	200	864,831	4324	233	1,317,411	5654
California	.....	.....	.....	2,078	8,592,398	4135	1,977	7,225,356	3655	12	6,651	554	2,090	8,599,049	4114	2,043	7,298,224	3572
Colorado	.....	.....	.....	53	323,492	6104	30	150,711	5024	.....	.....	.....	53	323,492	6104	30	150,711	5024
Florida	.....	.....	.....	15	98,395	6560	7	39,948	5707	.....	.....	.....	15	98,395	6560	7	39,948	5707
Georgia	.....	.....	.....	6	19,502	3250	8	44,028	5504	.....	.....	.....	6	19,502	3250	8	44,028	5504
Illinois	14	32,653	2332	1,778	4,601,038	2588	1,996	5,170,709	2591	130	16,562	127	1,908	4,617,600	2420	2,066	5,188,996	2512
Indiana	.....	.....	.....	322	512,970	1593	326	603,681	1852	10	2,581	258	332	515,551	1553	335	607,583	1814
Iowa	.....	.....	.....	1	1,250	1250	2	3,470	1735	.....	.....	.....	1	1,250	1250	2	3,470	1735
Kansas	13	44,060	3389	1,683	5,516,879	3278	1,706	5,755,720	3374	74	17,083	231	1,757	5,533,962	3150	1,725	5,760,106	3339
Kentucky	.....	.....	.....	651	1,158,137	1779	812	1,490,022	1835	7	798	114	658	1,158,935	1761	826	1,497,739	1813
Louisiana	1	8,425	8425	1,081	7,791,075	7207	772	5,776,546	7483	6	7,530	1,255	1,087	7,798,605	7174	778	5,780,925	7430
North Louisiana	1	8,425	8425	457	2,094,342	4583	284	1,258,552	4432	2	3,153	1576	459	2,097,495	4570	286	1,258,862	4402
South Louisiana	.....	.....	.....	624	5,696,733	9129	488	4,517,994	9258	4	4,377	1094	628	5,701,110	9078	492	4,522,063	9191
Michigan	.....	.....	.....	761	1,968,757	2587	683	1,676,434	2455	2	1,416	708	763	1,970,173	2582	688	1,686,056	2451
Mississippi	.....	.....	.....	368	2,440,715	6632	213	1,243,907	5840	1	172	172	369	2,440,887	6615	213	1,243,907	5840
Missouri	.....	.....	.....	44	48,894	1111	61	41,455	680	4	1,170	293	48	50,064	1043	61	41,455	680
Montana	2	5,048	2524	237	589,166	2486	335	863,612	2578	1	9	9	238	589,175	2476	335	863,612	2578
Nebraska	.....	.....	.....	5	16,800	3360	17	53,997	3176	.....	.....	.....	5	16,800	3360	18	56,186	3121
New Mexico	.....	.....	.....	423	1,545,223	3653	416	1,291,994	3106	2	1,335	668	425	1,546,558	3639	422	1,294,646	3068
New York	.....	.....	.....	1,138	1,590,168	1397	1,249	1,717,358	1375	.....	.....	.....	1,138	1,590,168	1397	1,249	1,717,358	1375
North Carolina	.....	.....	.....	1	4,044	4044	.....	.....	.....	.....	.....	.....	1	4,044	4044	.....	.....	.....
Ohio	.....	.....	.....	1,021	2,581,504	2528	1,023	2,681,828	2622	2	175	87	1,023	2,581,679	2524	1,024	2,681,835	2619
Oklahoma	9	22,073	2453	2,296	9,268,557	4037	1,861	7,061,587	3795	55	22,363	407	2,351	9,290,920	3952	1,891	7,071,174	3739
Pennsylvania	.....	.....	.....	2,911	5,029,047	1728	3,059	5,460,062	1785	18	14,609	812	2,929	5,043,656	1722	3,060	5,460,485	1784
South Dakota	.....	.....	.....	1	4,950	4950	.....	.....	.....	.....	.....	.....	1	4,950	4950	.....	.....	.....
Tennessee	.....	.....	.....	4	8,630	2158	9	7,848	872	.....	.....	.....	4	8,630	2158	9	7,848	872
Texas	5	10,330	2066	7,278	32,638,758	4485	6,093	27,650,480	4538	131	57,893	442	7,409	32,696,651	4413	6,235	27,721,738	4446
E. Tex. Bor. Co.'s	.....	.....	.....	128	827,434	6,464	35	217,260	6207	.....	.....	.....	128	827,434	6464	35	217,260	6217
East Texas Field	.....	.....	.....	.....	.....	.....	1	4,049	4049	.....	.....	.....	.....	.....	.....	4	4,509	1127
Rest of E. Texas	.....	.....	.....	263	1,589,668	6044	278	1,669,851	6007	5	6,149	1230	268	1,595,817	5955	280	1,670,216	5965
North Texas	4	2,380	595	1,830	4,551,718	2487	1,373	4,093,263	2981	20	13,554	678	1,850	4,565,272	2468	1,415	4,109,191	2904
W. Central Texas	.....	.....	.....	471	1,298,298	2756	400	987,669	2469	11	7,045	640	482	1,305,343	2708	419	997,213	2380
West Texas	.....	.....	.....	1,680	8,287,958	4933	1,591	7,246,101	4554	52	18,396	354	1,732	8,306,354	4796	1,648	7,274,519	4414
Texas Panhandle	.....	.....	.....	561	1,774,284	3163	329	1,038,237	3156	27	2,507	93	588	1,776,791	3022	332	1,040,618	3134
Gulf Coast, Upper	.....	.....	.....	706	5,172,618	7327	602	4,351,276	7228	7	4,061	580	713	5,176,679	7260	612	4,360,130	7124
Gulf Coast, Lower	.....	.....	.....	1,070	6,815,703	6370	924	5,887,008	6371	7	6,068	867	1,077	6,821,771	6334	927	5,889,060	6353
Southwest Texas	.....	.....	.....	474	1,878,811	3964	456	1,805,247	3959	2	113	56	476	1,878,924	3947	458	1,807,497	3947
S. Central Texas	1	7,950	7950	95	442,266	4655	104	350,528	3370	.....	.....	.....	95	442,266	4655	105	351,525	3348
Utah	.....	.....	.....	.....	.....	.....	1	4,743	4743	.....	.....	.....	.....	.....	.....	1	4,743	4743
Washington	.....	.....	.....	1	3,200	3200	.....	.....	.....	.....	.....	.....	1	3,200	3200	.....	.....	.....
West Virginia	.....	.....	.....	768	2,064,454	2688	973	2,514,254	2584	35	26,660	762	803	2,091,114	2604	975	2,516,364	2581
Wyoming	.....	.....	.....	193	875,286	4535	176	787,768	4476	.....	.....	.....	193	875,286	4535	177	787,919	4452
Total U. S.	44	122,589	2786	25,354	90,309,028	3562	24,080	80,837,558	3357	492	177,187	360	25,846	90,486,215	3501	24,455	81,049,279	3314

EVEN TOUGH LOCATIONS DON'T STOP FRANKS



IMPROVED
ALL-SERVICE UNITS
100% Portable

Reduces Rig-up, Tear-down and Move Time.

Eliminates Individual Well Servicing Derrick Cost.

Will Stack 10,000 Feet of Tubing.

Carries Lines and Blocks Strung.

Derrick Raised in 4 to 7 Minutes by Power of Truck Engine.

NOMINAL CAPACITIES

Pull rods and tubing to 10,000 feet; general rotary clean-out work to 8500 feet with 2⅞" O.D. drill pipe; Cable tools for "tailing in", deepening and clean-out from grass roots to 5000 feet with 7¼ x 12, or 7¼ x 14 independently powered pump.

In keeping with Franks' policy of servicing its equipment and as an extension for such service we have established two additional field service points and two resident field service men.

WEST TEXAS: ODESSA
EAST TEXAS: LONGVIEW
In these areas call these points for Franks Field Service

FRANKS MODEL 7000 A 10,000 Ft. Capacity Power Take-Off Unit with Attachments for all Phases of Well Servicing and Clean-out Work.

MAIN OFFICE, BOX 3218 TULSA, OKLAHOMA, U. S. A.

FRANKS REPRESENTATIVES

Export: A. V. Simonson, 149 Broadway, New York, N.Y.

California: Hillman-Kelley, Inc., 1000 Macy Street, Los Angeles.

Illinois Basin: Stuart E. Corry, Box 51, Fairfield, Illinois.

Texas, Louisiana, New Mexico: R. M. White, 823 Neil P. Anderson Bldg., Fort Worth, Texas.

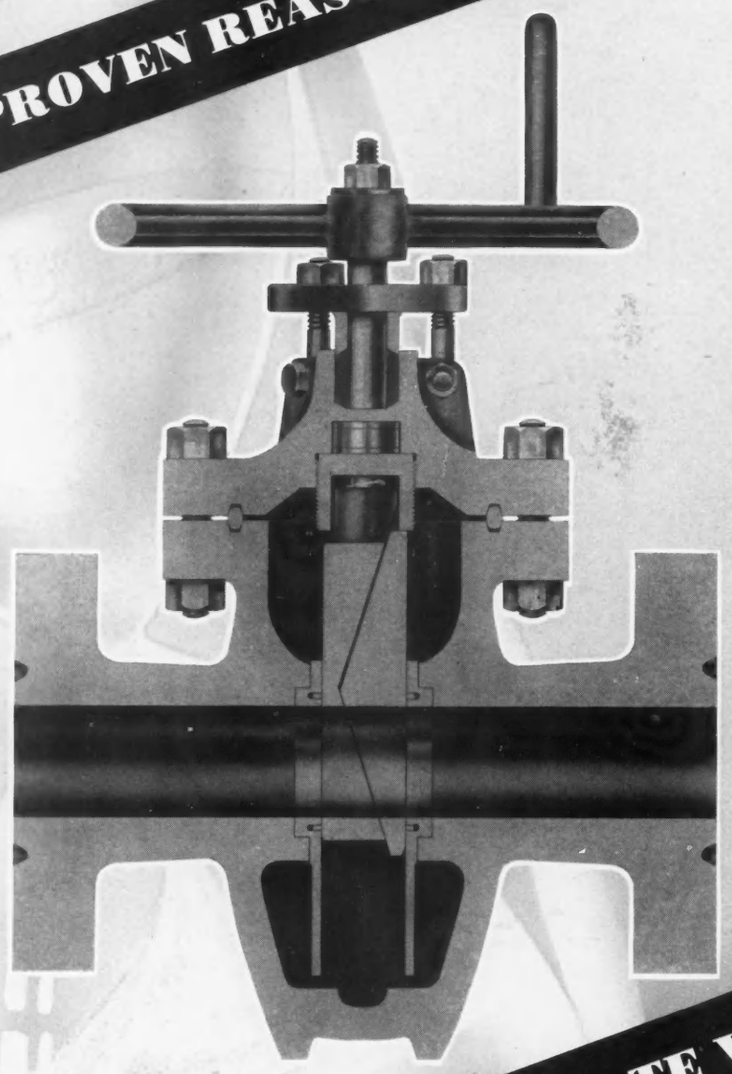
Rocky Mountain: Industrial Power Units, Inc., Box 152, Casper, Wyo.

FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS

To Seattle
San Diego
Mexicali
Pheonix
To
U N I T E D
S T A T E S
To New York
Ft. Worth
Dallas
Shreveport
Jackson
Montgomery
To Miami
Mobile
Pensacola
New Orleans
Houston
Galveston
San Antonio
Ciudad Juarez
Rio Grande
SONORA
Hermosillo
CHIHUAHUA
Chihuahua
COAHUILA
Rio Grande
LAREDO
NUEVO LEON
LA PRESA
MISION A
RANCHERIOS
Reynosa
Brownsville
Monterrey
Saltillo
GULF OF CALIFORNIA
BAJA CALIFORNIA
SINALOA
DURANGO
Culiacán
La Paz
Durango
ZACATECAS
TAMAULIPAS
Ciudad Victoria
Tropic of Cancer
PACIFIC OCEAN
Zacatecas
SAN LUIS POTOSI
TAMPICO-PANUCO FIELDS
Tampico
NAYARIT
San Luis Potosi
Aguascalientes
Teple
SAN PEDRO
MAGUEY
GOLDEN LANE FIELDS
Tuxpan
GUANAJUATO
Guanajuato
Queretaro
HIDALGO
POZA RICA
FURRERO
Guadalajara
Salamanca
Pachuca
JALISCO
Morelia
Toluca
Mexico City
Tlaxcala
Jalapa
Veracruz
Colima
MICHOACAN
Cuernavaca
Puebla
Coatzacoalcos
ISTHMUS
Villa Hermosa
FIELDS
GUERRERO
Chilpancingo
Oaxaca
OAXACA
Tuxtla Gutierrez
CHIAPAS
GULF OF TEHUANTEPEC
CENTRAL AMERICA
Guatemala
San Salvador
To Panama
Merida
YUCATAN
Campeche
QUINTANA ROO
Payo Obispo
CAMPECHE
Legend
OIL FIELDS
GAS FIELDS
ABANDONED FIELDS
Pipe Lines
Refineries
Proven Oil Areas
Favorable Oil Areas
Roads
Railroads
Airlines
Towns
Scale
0 50 100 150 Miles
0 50 100 150 Kilometers

MEXICO

FOR NINE TIME-PROVEN REASONS . . .



. . . W-K-M . . . FIRST CHOICE IN GATE VALVES

- Pressure confined to smooth, through-conduit flow away . . . no turbulence . . . no restriction of flow
- Lubricant contained in entire body and bonn . . . assures easy operation . . . preven internal corrosion.
- Parallel expanding gates mean a tight positi shut-off every time, on both sides, at full rat pressure.
- No recess or cavity to collect sediment wh open, or to prevent closing when desired.
- Seats are never exposed in open or closed positi
- Oversize renewable bronze seats.
- Combination wipe and seal rings keep the ga clean . . . pressure out . . . grease in.
- Economical, dependable performance in fi after field . . . year after year.
- W-K-M Gate Valves may be renewed over a over again . . . because all working parts a easily replaceable.

This "top spot" was earned by dependable service over a long period of time . . . under all conditions. It was earned because the exclusive through-conduit design of W-K-M Gate Valves has eliminated valve troubles throughout the fields of the world. You can be sure that a W-K-M Gate Valve will always effect a complete shut-off . . . always open or close under full rated pressure. Don't accept less "valve-value" than these exclusive features offer you.

W-K-M Company, Inc.

OIL FIELD PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
LOS ANGELES

Cable Address: "WILKOMAC"
Export Office: 30 Rockefeller Plaza, New York, N. Y.

MEXICO

Recent, Current and Prospective Drilling in Mexico Fields

FIELD AND STATE	WELLS COMPLETED IN FIELDS IN 1945					Field Wells Drilling, Rigging Up and Shut Down, at End of 1945				Drilling Prospect 1946 Percent
	Oil	Gas	Dry	Total Wells	Total Footage	Drilling	RU	SD	Total	
NORTHEASTERN MEXICO:										
La Presa, Tamps.	0	0	0	0	0	0	0	0	0	.....
Laredo, Tamps.	0	0	0	0	0	0	0	0	0	.....
Mier, Tamps.	0	1	0	1	5,280	0	0	0	0	?
Mision, Tamps.	0	2	0	2	12,140	0	1	0	1	+100.0
Rancherias, Tamps.	0	0	0	0	0	0	0	0	0	.....
TAMPICO AREA:										
Poza Rica, Vera Cruz.	9	0	0	9	67,043	5	0	0	5	+33.3
Northern District, Vera Cruz, Tamps., S. L. P., (Ebano, Panuco, etc.)	5	0	11	16	32,481	3	0	4	7	—37.5
Southern District, Vera Cruz, (Golden Lane)	0	0	0	0	0	0	0	0	0	.....
Other Fields (San Sebastian, Tanhuijo, etc.)	0	0	0	0	0	0	0	0	0	.....
ISTHMUS OF TEHUANTEPEC:										
Cuichapa, Vera Cruz.	4	0	0	4	9,150	0	0	0	0	—25.0
El Burro, Vera Cruz.	0	0	0	0	0	0	0	0	0	.....
El Plan (Lignitic Hor.) Vera Cruz.	1	0	0	1	5,921	1	0	2	3	+200.0
El Plan (Concepcion Hor.) Vera Cruz.	6	0	2	8	49,969	1	1	0	2	+12.5
El Plan (Eastern Ext.) Vera Cruz.	2	0	0	2	12,408	0	0	0	0	+150.0
Filisola, Vera Cruz.	0	0	0	0	0	0	0	0	0	.....
Teapa Nuevo, Vera Cruz.	0	0	0	0	0	0	0	0	0	.....
Tonala, Vera Cruz.	0	0	0	0	0	0	0	0	0	.....
Other Fields (Ixhuatlan, Sarlat, etc.)	0	0	0	0	0	0	0	0	0	.....
Total	27	3	13	43	194,392	10	2	6	18	.....

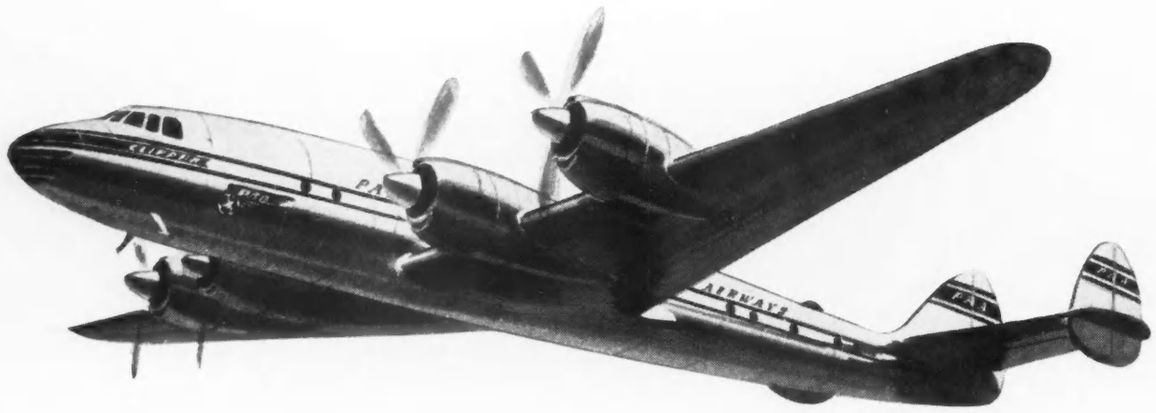
Producing Oil Wells and Crude Oil Production in Mexico Fields

FIELD AND STATE	Year of Discovery	Oil Wells at End of 1945				CRUDE OIL PRODUCTION—(Barrels)			
		Shut In	Producing: Flowing	Producing: Art. Lift	Producing: Total	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
NORTHEASTERN MEXICO:									
La Presa, **Tamps.**	1931	.....	.....	.....	.....	.....	gas	gas	gas
Laredo, **Tamps.**	1937	.....	.....	.....	.....	.....	gas	gas	gas
Mier, **Tamps.**	1936	.....	.....	.....	.....	.....	gas	gas	gas
Mision, **Tamps.**	1945	.....	.....	.....	.....	.....	gas	gas	gas
Rancherias, **Tamps.**	1933	.....	.....	.....	.....	.....	gas	gas	gas
TAMPICO AREA:									
Poza Rica, **Vera Cruz.**	1930	2	57	.....	57	62,674	20,952,208	22,876,076	235,587,406
Northern District, **Vera Cruz, Tamps. S.L.P.** (Ebano, Panuco, etc.)	1904	127	551	.....	551	14,446	3,625,834	5,272,907	772,462,332
Southern District, Ver. (Golden Lane)	1908	21	225	.....	225	27,417	8,265,678	10,007,233	1,060,968,576
Other Fields (San Sebastian, Tanhuijo, Mecatepec, Furbero, etc.)	.....	7	1	.....	1	57	22,089	20,904	4,103,753
STHMUS OF TEHUANTEPEC:									
Cuichapa, **Vera Cruz**	1934	4	8	.....	8	957	228,730	349,189	1,239,059
El Burro, **Vera Cruz**	1930	6	.....	30	30	1,771	490,402	646,412	15,503,898
El Plan (Lignitic Hor.) **Vera Cruz**	1931	32	2	33	35	4,170	2,127,179	1,522,018	50,196,398
El Plan (Concepcion Hor.) **Vera Cruz**	1943	.....	18	1	19	4,134	988,108	1,508,825	2,723,355
El Plan (Eastern Ext.), **Vera Cruz**	1934	.....	2	1	3	110	29,237	39,990	648,111
Filisola, **Vera Cruz**	1921	.....	.....	36	36	850	340,894	310,221	20,523,685
Teapa Nuevo, **Vera Cruz**	1928	8	.....	.....	.....	.....	27,619	.....	202,596
Tonala, **Veru Cruz**	1928	12	.....	74	74	2,326	969,762	849,046	43,733,651
Other Fields (San Cristobal, Capoacan, Concepcion, Techanapa, Ixhuatlan, Belem, Sarlat, etc.)	.....	5	.....	2	2	0.1	8,264	31	377,197
Total	.....	224	864	177	1,041	118,912	37,716,004	43,402,852	2,208,270,017

Engineering and Geological Data on Mexico's Oil Fields

FIELD AND STATE	Location on Map	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION: Name	Kind	Age	Depths of Wells (Feet): Minimum Top Pay	Depths of Wells (Feet): Maximum Total Depth	Average Thickness Pay (Ft.)	Type Structure
NORTHEASTERN MEXICO:	**Page 75**									
La Presa, **Tamaulipas**	D-8	.....	gas	Mt. Selman	Sand	Eocene	1925	3160	38	Anticline
Laredo, **Tamaulipas**	D-8	70	gas	Mt. Selman	Sand	Eocene	720	732	12	Anticline
Mier, **Tamaulipas**	.....	.....	gas	Mt. Selman	Sand	Eocene	2120	2345	.....	Nose
Mision, **Tamaulipas**	D-9	.....	dist.	Vicksburg	Sand	Lwr. Olig.	.....	6040	.....	Anticline
Rancherias, **Tamps.**	D-9	1230	gas	Fayette / Yegua / Cook Mt.	Sand	Eocene	264	2440	310	Anticline
TAMPICO AREA:	**Page 75**									
Poza Rica, **Vera Cruz.**	G-9	15,850	30	Tamabra	Lime	Lwr. Cre.	7250	7546	296	Nose
Northern District, **Ver.-Tamps.** (Ebano, Panuco, etc.)	F-9	100,000	12	Tamaulipas	Lime fractures	Lwr. Cre.	1148	1968	*	Faulted Ant.
Southern District, **Vera Cruz,** (Golden Lane)	G-9	33,000	20	El Abra	Lime reef	Lwr. Cre.	2200	2202	†	Faulted Ant.
Soledad, **Vera Cruz**	G-9	.....	40	Tamabra	Lime	Lwr. Cre.	6435	6480	10	Nose
ISTHMUS OF TEHUANTEPEC:	**Page 83**									
Cuichapa, **Vera Cruz**	F-5	300	30	Concepcion Inferior	Sand	Miocene	2100	2133	33	Faulted dome
El Burro, **Vera Cruz**	E-6	370	26	Concep. Inf; Encanto	Sands	Miocene	2460	2620	62	Salt dome
El Plan, Lignitic Zone, **Vera Cruz**	F-6	830	24	Cedral, Lignitic	Sands	Miocene	1970	2440	216	Faulted Ant.
El Plan, Concepcion, **Ver**	.....	250	30	Concep. Inf. Sup.	Sands	Miocene	5734	5865	131	Dome
El Plan, East Extension, **Vera Cruz**	.....	80	35	Concep. Inf., Encanto.	Sands	Miocene	3883	4110	32	Faulted nose
Filisola, **Vera Cruz**	F-5	460	22	Encanto	Sand	Miocene	1585	1980	92	Fltd. terrace
Nuevo Teapa, **Ver**	E-5	40	36	Encanto	Sand	Miocene	429	711	29	Salt dome
Tonala, **Vera Cruz**	E-6	470	28	Concep. Inf; Encanto	Sands	Miocene	1640	2130	167	Salt dome
				Deposito	Sand	Oligocene				

* Prod. from fractures in first 800 feet of Tamaulipas and San Felipe limes.
† Wells go into reef-phase limestone only about 2 feet.



Pan American offers a world-wide air service to Oil Men

Big, fast new Clippers now make distant fields only hours away

Giant new Clippers now bring within easy reach most of the world's big oil fields. Trips which formerly consumed days—over oceans and jungle-locked hills—are now a matter of hours from Pan American's convenient U. S. gateways.

You can fly from Miami, New Orleans, Nuevo Laredo, Brownsville or Los Angeles to all the important oil regions of Latin America. Service to Hawaii is now being increased from San Francisco and Los Angeles, with plans under way for regular flights to the Far East and Australasia; from New York, Clippers now fly to England, the Continent and Africa, with a projected route to the Middle East and clear through to Calcutta, India. New routes are being added just as fast as government permission is granted. Mammoth, double-decked, high-speed Clippers will go into service soon.

In over-ocean transportation, as in prospecting or drilling, there is no substitute for experience. Pan American's know-how is born of 18 years of long-range flying. World-famous Pan American service includes complimentary hot meals aloft, stewardess service, careful handling of luggage and valuable instruments. For reservations and schedules get in touch with your Travel Agent or the nearest Pan American office.

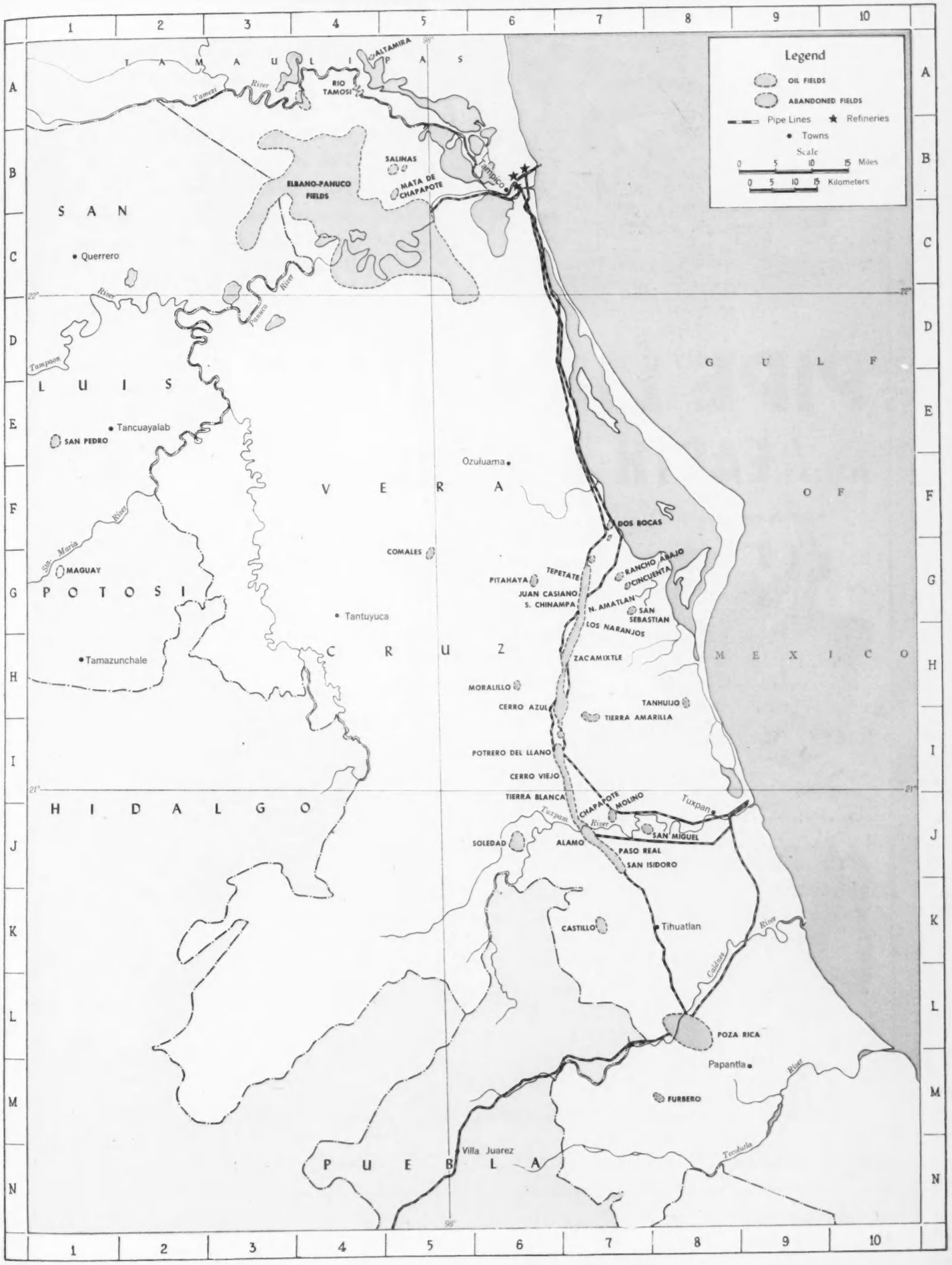
IF IT ISN'T OPERATED BY PAN AMERICAN, IT ISN'T A CLIPPER

PAN AMERICAN WORLD AIRWAYS

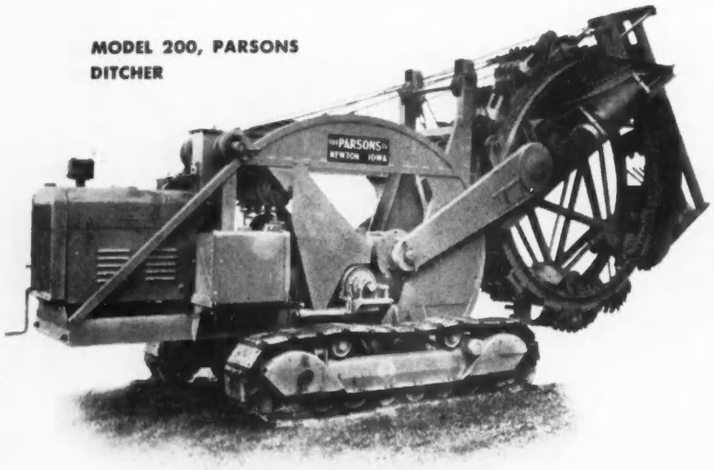
The System of the Flying Clippers

PAA

MEXICO—Tampico Area



MODEL 200, PARSONS DITCHER



A Parsons Wheel Trenchliner speeds the completion of contracts with consequently greater profits. The Trenchliner gives outstanding performance on tough jobs, in gumbo, clay, shale or compacted sand, because all the latest improvements assure you of the greatest speed of operation under all soil conditions.

PIPE LINE SUPPLIES *and* EARTH MOVING EQUIPMENT

GORMAN-RUPP PUMPS

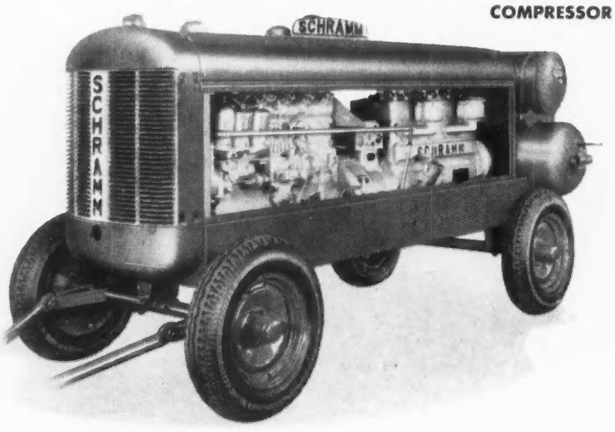
Bucyrus-Erie Angle Dozers · Koehring Backhoes, Draglines and Excavators · International Tractractors and Wheel Tractors · Union Wire Rope · General Pipe Hooks · Tipton Pipe Clamps · Pipe Straighteners · Blocks · Belt Slings · Hand Shovels · Welding Dollies · Chains · Machine Paint Rugs · Hand Paint Rugs · Pipe Cradles · Boomers · Paint and Wire Brushes in all needed styles and sizes.

INTERNATIONAL ENGINES

Schramm Air Compressors are gasoline or diesel driven. Capacities from 20 cu. ft. to 420 cu. ft. at 100 pounds pressure. Portable and stationary units.

Write, wire or telephone for descriptions and prices of the equipment you need.

MODEL 315, SCHRAMM COMPRESSOR



The Clarence L. Boyd Co., Inc.

TULSA, OKLAHOMA . . . Phone LD 745

GUTHRIE, OKLAHOMA . . . Phone LD 1

MEXICO—Continued

PRODUCTS LINES

One natural gas line and one products carrier are in operation in Mexico.

The 96-mile, 12-inch natural gas line is operated between the Texas border below Roma to Monterrey by Compania Mexicana de Gas, S.A. (United Gas Corporation). The line is fed by South Texas fields, connecting with 47-mile, 12-inch line to the Jennings field. The carrier was built in 1929 with a capacity of 21 million cubic feet daily. The original plans contemplated that capacity of 30 million cubic feet daily would be provided by addition of a compressor station.

In the Isthmus, Petroleos Mexicanos operates a 23-mile,

Crude Oil Pipe Lines of Mexico

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	No. of Pump Stations	Capacity of Line (Barrels Daily)	Year Completed	Status
Note: All crude oil pipe lines in Mexico are held by Petroleos Mexicanos, the government-operated company.								
EBANO—PANUCO FIELDS—								
Ebano District: Main line to Tampico (Chijol-Pumping Station H): being single line of 10" and 8" pipe, partly looped, over 35 mile route.	(5 mile section)		5	8				
	(5 mile section)		5 5	10 10				
	(8 mile section)		8	10				
	(17 mile section)		17 17	10 10				
Branch lines of above trunk lines.			50 24	10 8				
Cacalilao—Panuco District: Main line north-south across field, connecting with line to Tampico and with river terminals; single 8" line over 24 mile route.	Corcovado No. 1 Well	Las Delicias	24	8	63	30,000	....	In Use
Branches from above trunk lines, involving total mileages of different size pipe as tabulated.			6 11 1 2	10 8 6 4				
Reventadero District: Main line north-south across southern half of field, delivering to river terminals; being single line partly 8" and partly 10", over 14 mile route (Tanantoro—Pumping Station 4).	Tanantoro (8 mile section) (4 mile section) (2 mile section)	Pump Sta. 4	8 4 2	8 10 8				
Terminal adjuncts to above main line: 11 lines of 10" pipe, each 2 mile long.	11 lines	each	2	10				
Branches from above main lines.			9 1	8 6				
POZA RICA—GOLDEN LANE FIELDS— Poza Rica—Mecixo City Line, present facilities.	Poza Rica	Mexico City	147	10	*7	*22,500	*1940	In use.
Poza Rica—Salamanca Line (planned).	Poza Rica	Salamanca	290	12	*7	*30,000	....	Surveyed.
Poza Rica-Tuxpam triple line (one unit partly looped), over 39 mile route.	Poza Rica Poza Rica Poza Rica	Tuxpam (Loop) Tuxpam Tuxpam	39 12 39 39	12 12 8 6	2	125,000	†1940	In use.
Tuxpam-Potrero double line over 33 mile route.	Tuxpam Tuxpam	Potrero Potrero	33 33	8 8	2	50,000	....	In use.
Cobos-Alamo line (was Penn Mex.)	Cobos	Alamo	20	8	1	25,000	....	In Use.
Alamo-Tampico single line of 10" and 8" pipe over 103 mile route, partly looped.	Alamo Loop: Potrero	Tampico Cerro Azul	103 11	8 & 10 10	4	24,000	....	In Use. (was Huasteca)
Poza Rica-Tampico 3 section line (Poza Rica crude); 35 mile of single 14 mile of double, and 87 mile triple line, over 136 mile route.	Poza Rica	Alamo	35	12	1	53,000	‡1941	In Use.
	Alamo Alamo	Potrero Potrero	14 14	8 10	1	75,000	....	In Use.
	Potrero Potrero Potrero	Chijol Chijol Chijol	87 87 87	8 8 8	6	72,000	....	In Use; (was Aguila).
ISTHMUS FIELDS— Tonala-Minatitlan single line, varied size pipe over 35 mile route	Tonala Field	Minatitlan Refinery	6 20 9	8 10 12	1			
El Plan-El Chapo single line, varied size, 21 miles long.	El Plan Field	El Chapo Station	9 9 3	8 10 12	1	30,000	....	In use.
El Chapo Station-Nanchital terminal single line.	El Chapo	Nanchital	6	10	1			
Cuichapa Field to El Plan—El Chapo line.	Cuichapa	kilmo. 22	3	8	1		‡1939	

* Poza-Rica Mexico City line completed originally in early 1932 with capacity of 15,000 barrels daily; capacity increased to 22,500 daily in 1940; will be increased to potential of 50,000 daily by 1945-1946 installation of new centrifugal pumps at 6 existing booster stations (Stations 2-7) and similar pumps at three new stations including one between Poza Rica and Station 2 and two between Station 7 and Mexico City. The existing reciprocating pumps at stations from Poza Rica through Station 7 will be undistrubed and used for pumping crude through new 12-inch line to be laid alongside existing line to Station 7 and thence to Salamanca, where refinery construction has been started.

† At this date the 12-inch line was laid; the 8" and 6" lines existed previously.

‡ This line was entirely built at this date.

General Note: Lines for which completion year is not shown were built prior to the expropriation in 1938.

Announcing

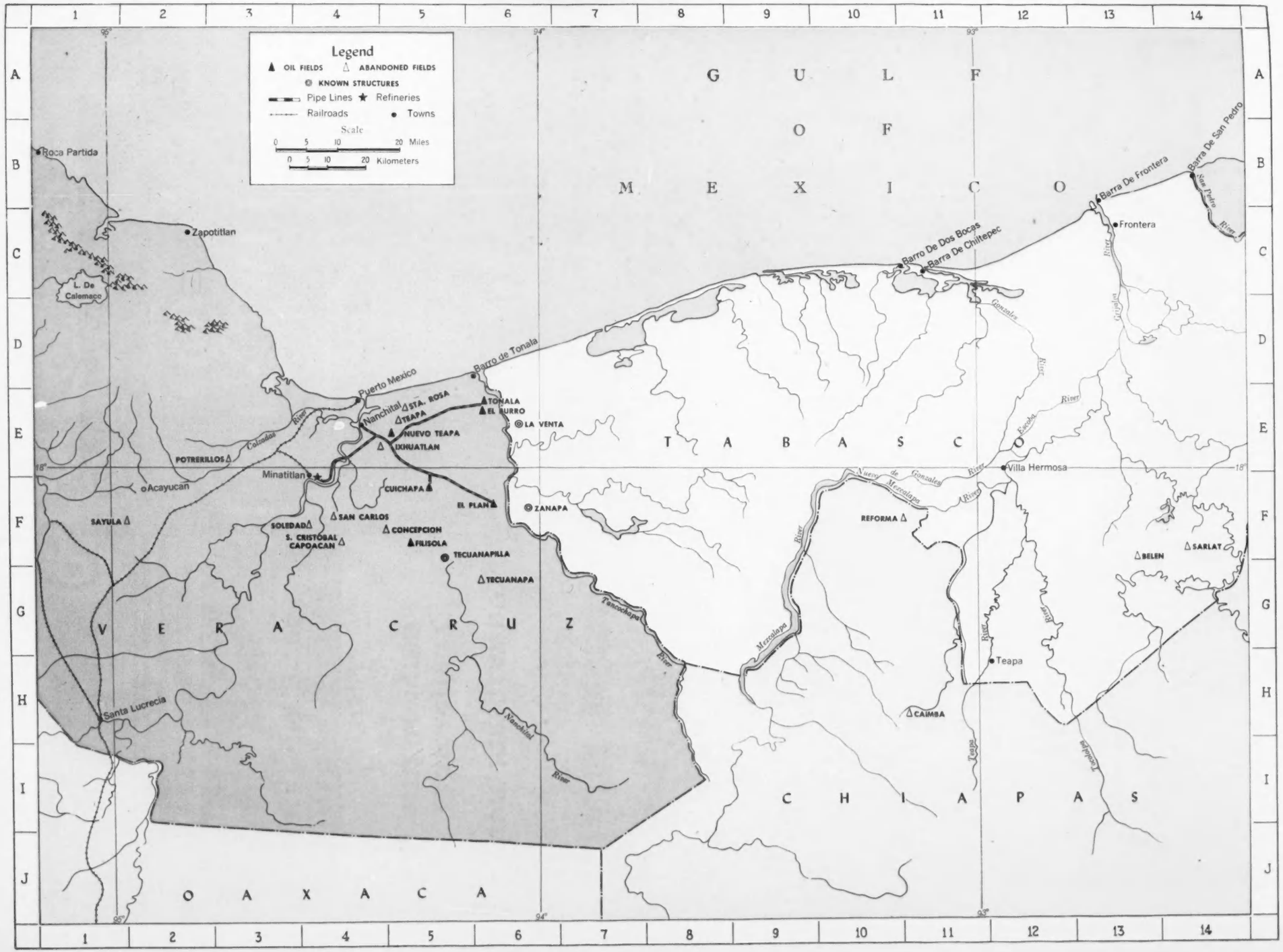
ANOTHER McCOLLUM FIRST

RAPID—ECONOMICAL MARINE EXPLORATION

- Recent developments in marine surveying, geophysical equipment and techniques, and marine station marking make possible reflection seismograph exploration of marine areas which is faster, cheaper, and more accurate than land exploration.
- McCollum now has a record of two years successful commercial operation in this work.
- The exploration of vast marine areas is now practical.

McCOLLUM SINCE 1923
Exploration Company

853 ESPERSON BUILDING • HOUSTON 2, TEXAS



MEXICO—Isthmus Area

THESE 36 LANE-WELLS BRANCHES ARE SERVICE HEADQUARTERS

Call

LANE-WELLS

for

GUN PERFORATING

★

RADIOACTIVITY WELL LOGGING

★

PACKERS

LINER HANGERS

BRIDGING PLUGS

★

Located in the principal oil producing areas are the 36 Lane-Wells Service Headquarters. On duty 24 hours a day, trained field crews, familiar with local conditions are ready to help you solve your completion and remedial problems.

Your local Telephone Directory lists your nearest Lane-Wells Branch and you'll find it pays to "Call Lane-Wells."

Tomorrow's Tools—Today!

LANE WELLS COMPANY

Los Angeles · Houston · Oklahoma City

General Offices, Export Office and Plant:

5610 South Soto Street · Los Angeles 11, California

MEXICO—Continued

3-inch products (gasoline) line between Tonala and Nanchital. This line has one pump station.

* * *

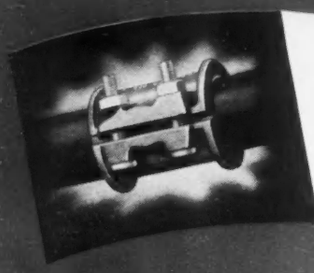
The cooperation of Petroleos Mexicanos, through its production department, headed by Ing. J. M. de la Garza Cardenas, is gratefully acknowledged.

Information on Mexico Wildcats

STATE	WELL, LOCATION	Date Completed	Total Depth (Feet)	RESULTS
	All wells shown are wildcats drilled by Petroleos Mexicanos, government company.			
	COMPLETIONS IN 1938-1941			
Various areas	Petroleos Mexicanos	1938-1941	....	Wildcat completions; 2 in 1938; 1 in 1939; none in 1940; 1 in 1941.
	COMPLETIONS IN 1942			
Vera Cruz	Horcones 1, s of Golden Lane	1942	....	Salt water; abandoned.
Vera Cruz	Horcones 2, s of Golden Lane	1942	....	Dry and abandoned.
	COMPLETIONS IN 1943			
Vera Cruz	Rancho Nuevo 1, Lot 60, San Diego de la Mar, 4 mi nw famous Dos Bocas well of Golden Lane	1943	6600	Salt water; abandoned.
San Luis Potosi	Santa Ines 1, 30 mi sw Panuco	1943	....	Salt water; abandoned.
Tabasco	La Venta 1, e side Isthmus saline basin	1943	....	Dry and abandoned.
	COMPLETIONS IN 1944			
	Northern Zone:			
San Luis Potosi	Santa Ines 2, San Vicente Tancuayalab municipality, hacienda de Santa Ines, Santa Margarita property, 30 mi sw Panuco	6-15-44	4760	Dry; Tamaulipas lime, Cretaceous.
Vera Cruz	Aragon 2, Chicontepec municipality, hacienda de Francia, lot 202, w of Golden Lane	11-15-44	7260	Dry; Tamaulipas lime; Cretaceoua.
	Southern Zone:			
Tabasco	Zanapa 1, Huimanguillo municipality, National (federal gov't.) Lands, e of El Plan field, Isthmus	7-18-44	343	Dry; salt. Above salt, Quaternary formations.
Tabasco	La Venta 2, Huimanguillo municipality, La venta property, e of El Burro field, Isthmus	11-28-44	2493	Dry; salt. Above salt, Upper Miocene.
	COMPLETIONS IN 1945			
	Northern Zone:			
Tamaulipas	Mision 1, Reynosa municipality, La Mision Land, Frac. A	4-10-45	6041	Productive: 6000 MCF gas and 45 bbls. distillate per day with 23/64" choke. Mision Sands—Vicksburg formation, Lower Oligocene.
Vera Cruz	Ojital 3, Papantla municipality, Ojital y Potrero Hacienda, lot No. 152	5- 7-45	8030	Dry hole; Tamabra limestone, Cretaceous.
Vera Cruz	Soledad 1, Temapache municipality, Guadalupe Hacienda, Frac. A	7-30-45	6482	Productive: 40 bbls./day of 40 gravity oil with 4/64" choke. Tamabra limestone, Cretaceous.
Tamaulipas	Mision 2, Reynosa municipality, La Mision Land	10-31-45	1859	Productive: Gas and distillate, not measured. Heard sand, Vicksburg formation, Lower Oligocene.
Vera Cruz	Soledad 2, Temapache municipality, Guadalupe Hacienda, Frac. B	12-21-45	6980	Dry hole. Tamabra limestone, Cretaceous age.
Vera Cruz	Soledad 3, Temapache munucipality, Guadalupe Hacienda, Frac. A	12-21-45	6604	Dry hole. Tamabra limestone, Cretaceous.
Vera Cruz	Castillo de Teayo 3, Castillo de teayo municipality, Castillo Hacienda, lot No. 57, Frac. A	12-30-45	7797	Dry hole. Tamabra limestone, Cretaceous.
	Southern Zone:			
Tabasco	La Venta 4, Huimanguillo municipality, La Venta Property	5- 2-45	3648	Dry hole. Salt. Above salt, Upper Miocene.
Vera Cruz	Tecuanapilla 2, Minatitlan municipality, Romero Rubio first zone, lot No. 3	10-11-45	2356	Dry hole. La Laja formation, Middle Oligocene.
Tabasco	La venta 6, Huimanguillo municipality, La Venta Property	12-31-45	6217	Dry hole. Encanto formation, Lower Miocene.
	COMPLETIONS IN 1946—(Up to March 8, 1946).			
	Northern Zone:			
Vera Cruz	Asuncion 3, Tuxpan municipality, Asuncion Property, lot No. 123, Frac. A	2-12-46	3426	Dry hole. Tamabra limestone, Cretaceous age.
	CURRENTLY DRILLING—(March 8, 1946)			
	Northern Zone:			
Nuevo Leon	Las Norias 1, General Bravo municipality, Comunidad El Zacate, Las Norias Property	.....	2781	Suspended, waiting for new Diesel engines.
Tamaulipas	Mision 3, Reynosa municipality, La Mision Land	.....	4694	Drilling in Vicksburg formation; gas shows.
Tamaulipas	Mision 4, Reynosa municipality, La Mision Land	.....	2988	Drilling.
	Southern Zone:			
Vera Cruz	Tecuanapilla 1, Minatitlan municipality, Romero Rubio first zone, lot No. 3	.....	312	Drilling.

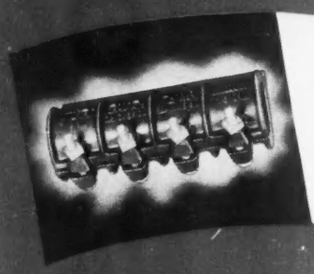
Data on Refineries of Mexico

COMPANY, ADDRESS	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery	Operating Status
Petroleos Mexicanos (government-owned), Avenida Juarez 94, Mexico, D. F., Mexico.:					
Tampico Plants—					
Ciudad Madero, n side Panuco River; was Aguila Co. plant	Ciudad Madero	55,000	8,500	Complete	Operating
Arbol Grande, n side Panuco River; was Sinclair-Pierce plant	Arbol Grande	20,500	None	Skimming; Lube; grease; asphalt; wax	Operating
Mata Redonda, s side Panuco River, across from Arbol Grande; was Huasteca then Standard N. J. plant	Mata Redonda	11,500	5,500	Skim-Crk	Operating but will be dismantled
Bella Vista, se of Ciudad Madero plant, on s side Panuco River; built by government	Bella Vista	4,700	1,100	Skim-Crk	Operated during war, but will be dismantled
Poza Rica—					
Poza Rica, bought by Aguila, installed by Pemex; topping unit, sends synthetic crude to Mexico City	Poza Rica	6,400	None	Skimming	Operating
Mexico City—					
Atzcapotzalco, suburbs of Mexico City, built by Aguila, doubled by Pemex; uses synthetic crude from Poza Rica-Tampico	Atzcapotzalco	22,000	None	Skimming	Operating; being expanded. Will have capacity of 50,000 bbls. crude daily. Adding new crude distillation plant, Dubbs crack-unit, alkylation plant, etc.
Salamanca—					
Salamanca; started; partly new, partly equipemnt from Mata Redonda and Bella Vista plants	Salamanca, state of Guanajuato	30,000	None	Skimming	Planned along with pipe line to Poza Rica
Isthmus—					
Minatitlan, n side Coatzacoalcos River; was Aguila plant	Minatitlan	27,500	2,500	Complete	Operating
Refinerias Mexico	Nuevo Laredo	330	None	Skimming	Operating
Refinerias Laredo	Nuevo Laredo	190	None	Skimming	Operating
Refineria Union	Monterrey	160	None	Skimming	Operating
Refineria del Norte	Ciudad Juarez	1,000	None	Skimming	Operating



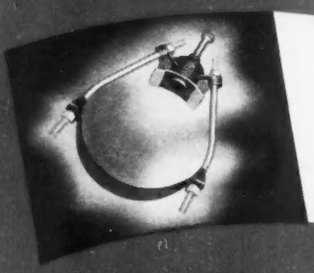
SKINNER-SEAL EMERGENCY PIPE CLAMP

For stopping leaks in pipe lines, instantly, permanently. Pipe sizes 1/2" to 12". Standard for forty years.



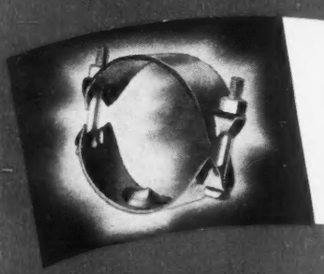
SKINNER-SEAL PIPE LINE CLAMP

For repairing long splits or very bad corrosion in pipe lines. Tremendously strong — for highest pressures.



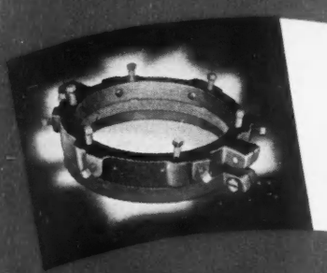
SKINNER-SEAL VENTED PLUG CLAMP

For stopping leaks in extremely high-pressure pipe lines — safely. No chance of injury or damage.



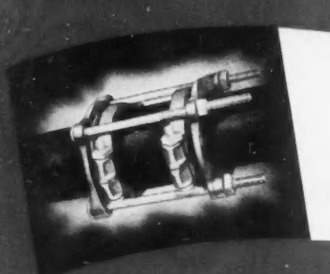
SKINNER-SEAL PRESSED STEEL ECONOMY CLAMP

For repairing badly pitted and corroded pipe lines at minimum cost. A strong, dependable clamp.



SKINNER-SEAL PIPE JOINT CLAMP

For stopping leaks at joints where pipe is screwed into a fitting. Without shutdown. Absolutely permanent.



SKINNER-SEAL COLLAR LEAK CLAMP

For stopping every type of collar leak, regardless of kind of collar or condition of line. Extremely rugged construction.

6 WAYS TO SAVE PIPE

AND MAKE LASTING REPAIRS, TOO!

Right now, with the critical shortage of pipe, the SKINNER-SEAL method of reparing pipe leaks is invaluable. Saves pipe, saves labor, saves time. Skinner offers a clamp for every leak. Deliveries are still uncertain, so we advise placing orders as far in advance as possible. Write for Catalog 41.

M. B. SKINNER CO.

Established 1898

SOUTH BEND, INDIANA, U.S.A.

CENTRAL AMERICA

NOW . . . An EXCLUSIVE Design Multiple Conductor Geophone Cable!

IT'S NEW . . . IT'S PRACTICAL . . . IT'S DIFFERENT

- **Eliminates cross feeds on long lengths of cable.**
- **Each conductor insulated with real rubber latex.**
- **Maximum performance with smallest possible OD.**
- **Contains no moisture absorbing materials.**
- **Ideal for salt water as well as land locations.**
- **Outer jacket of cable neoprene lead cured.**
- **Manufactured exclusively for Harrison.**
- **Designed specifically to meet your most exacting requirements.**

● This is truly the geophone cable you've been wanting for a long time! It is designed to meet your most exacting requirements with the most dependable performance you've ever had.

Manufactured exclusively for Harrison, this new multiple conductor geophone cable is designed in such a way as to eliminate cross feeds when using long lengths. Each conductor is insulated with real rubber latex which will give you maximum performance with smallest possible OD.

This new Harrison cable does not contain any moisture absorbing materials and is ideal for use in salt water as well as on land. The outer jacket is neoprene lead cured. It is truly a universal geophone cable and is the answer to a long felt need in geophysical operations.

Harrison's exclusive new multiple conductor geophone cable is supplied from our stocks in minimum lengths of 1,500 feet. Write or phone Harrison Equipment Company, Houston, for samples and full information on this revolutionary new multiple conductor geophone cable. Inquire, too, about any special portable cables you may require in your oil operations.

Harrison Equipment Co.

1422 SAN JACINTO **HOUSTON, TEXAS**

CENTRAL AMERICA

FIRST Central American drilling came in 1915, by National Petroleum Company, a mile west of an oil seep on Uscari Creek in *Costa Rica* west of Suretka. No favorable showings were found and the well was abandoned at 800 feet following mechanical difficulties. The Pinto-Greulich concession, on which this well is located, later was acquired by Costa Rica Oil Corporation (Sinclair) and drilled without success. In 1920 a well was started at Cahuita Point, where a gas sand was encountered (April, 1921) at 822 feet which caused a blowout and fire destroying the derrick and rig. Drilling later was resumed and the well completed late in 1922 at 3900 feet with no oil showings of consequence. When the well reached 3146 feet it had cost more than $303,000, including the $25,000 fire loss. The company also drilled at Puerto Viejo (Old Harbor) with no commercial shows.

The most favorable oil territory in Costa Rica is the triangular-shaped Caribbean coastal plain on which are found numerous oil seeps which apparently originate in Miocene beds. The largest seepage is on Uscari Creek near the site of the first well, where dark green oil of about 28 degrees gravity issues along a fault plane near the junction of the creek with the Amoura River, 7 miles west of Suretka. Other scattered seeps occur in Talamanca Valley mostly near faults, and there are a few seepages on the Pacific Coast side.

Gulf Oil Company, in *Nicaragua*, Punta Gorda 1 on the Caribbean coast, was abandoned in February of 1945 at 6735 feet. No shows were found, but further drilling in the area is likely since the company still retains its concessions and continues geophysical work with seismograph methods. The Punta Gorda 1 was drilled as a slim-hole stratigraphic test for information on deep formations. In 1934-35 Nicaraguan Oil Company, Inc., Boston Mining firm subsidiary, drilled 40 miles west of Managua to a depth exceeding 3000 feet.

Geological investigations in *Panama* were started in 1917 when Sinclair Panama Oil Corporation, subsidiary of Consolidated Oil Corporation, obtained several concessions in Darien, Chiriqui, Bocas del Toro and Colon. At the same time, Panama Gulf Oil Company, subsidiary of Gulf Oil Company, carried out geological exploration in a portion of Darien, in the region of Garachine on the Gulf of San Miguel.

On November 28, 1918, Sinclair Panama Oil Corporation started its first well on the island of Colon in the province of Bocas del Toro. It was junked at 1625 feet after which the rig was skidded and another well drilled to 3325 feet in the same area, being abandoned on May 30, 1923.

In Chiriqui the company started a well which was abandoned at 3862 feet in May without showings. Following these attempts, Sinclair concentrated operations in Darien, spudding a well August 1, 1925, on the Yape prospect, 11,520 feet east and 3500 feet north of the mouth of the Yape River, a tributary of the Rio Tuira. Drilled to 3503 feet, the last 200 feet was cap and soft sand with considerable gas and some indications of light oil, but the lower part of the sand carried water which flowed at the rate of 1000 barrels daily. Unable to complete this well as a producer, the company abandoned it in October. A second well, 3400 feet north and 850 feet west of the mouth of the Rio Capeti, was stopped at about the same depth without any shows.

The company then suspended activities until 1938, when seismograph exploration was carried out at Bocas del Toro.

Panama Gulf Oil Company started its operation in southwestern Darien in the region of the Gulf of San Miguel on the Garachine prospect. The first well, 10,725 feet south and 3120 feet west of the mouth of the Pinoguilla River, was completed at below 3200 feet without finding any oil or gas shows. The second well, between the first and the coast, drilled to 3069 feet without finding oil or gas in commercial quantities. The third well suspended work at 4986 feet, likewise with no commercial shows. The company then retired from Panama exploration.

Oil Tests Drilled in Central America

COMPANY AND WELL	Map Designation	Location on Map Page 87	Year Completed	Depth in Feet	Remarks
Costa Rica:					
Costa Rica Oil Corp.'s (Sinclair) four shallow wells	A	H-9	1923	1400	Drilled near seeps at Suretka.
Costa Rica Oil Corp.'s (Sinclair) Cahuita 1	B	H-9	1922	3862	Gas show at 822 ft.
Costa Rica Oil Corp.'s (Sinclair) Puerto Viejo 1	C	H-9	1923	2410	.....
Nicaragua:					
Gulf Oil and Atlantic Refining's Punta Gorda 1	A	D-9	1945	6735	.....
Miquel d'Escato's Cayetano 1	B	F-6	.....	500	.....
Davis & Company's San Rafael 1	C	F-6	1935	3940	.....
Panama:					
Sinclair Panama Oil Corp.'s Bocas del Toro 1	A	H-10	1922	1600	Casing collapsed.
Sinclair Panama Oil Corp.'s Bocas del Toro 2	A	H-10	1922	3250	.....
The Texas Company's David 1	B	I-9	1925	3862	.....
Panama Gulf Oil Corp.'s Garachine 1	C	I-13	1924	3250	.....
Paname Gulf Oil Corp.'s Garachine 2	D	I-13	1924	3069	Slight oil shows.
Panama Gulf Oil Corp.'s Garachine 3	E	I-13	1928	4986	Gas shows.
Sinclair Panama Oil Corp.'s Yape 1	F	I-14	1927	3508	.....
Sinclair Panama Oil Corp.'s Capeti 1	G	I-14	1927	995	Hole junked.
Sinclair Panama Oil Corp.'s Capeti 2	H	I-14	1927	3000	.....

Regions of the country which have the best sedimentary conditions are in Chiriqui, Bocas del Toro, and Darien. These were prospected by Sinclair, Gulf and The Texas Company, the latter having contributed toward drilling of wells by Sinclair, and held concessions in Chiriqui.

During the past several months, geologists working for Standard Oil Company have done geological work in these favorable regions. This firm, as well as Sinclair, Union Oil Company of California, and Gulf are now interested in acquiring concessions.

Guatemala's lowland El Peten area in the northern part of the country has reported seepages along the Rio Pasion and Rio San Pedro and at the western flank of the Cockscomb mountains. Bituminous formations have been found in the lower Cretaceous and upper Tertiary of El Peten and geological work indicates many marl and limestone beds which might serve as caps to retain accumulations of oil in the porus formations, but the area never has been drilled for oil. Shell interests acquired concessions in El Peten and held them for a number of years but released them without drilling. Gulf Oil Corporation has also held acreage here.

British Honduras also is still undrilled. There have been oil seeps noted near Orange Walk and in the northern plains area built of moderately folded Tertiary beds. The southern third of the country has moderately folded Cretaceous and Tertiary beds with bituminous outcrops near Punta Gorda. The Tertiary limestone outcrops on Temash River near Go-to-Hell Creek smell strongly of oil.

In *Honduras* limited prospecting seems to indicate the Cretaceous beds in the northern two-thirds of the country are so closely folded as to make unlikely accumulations of oil in any considerable quantities. Seepages have been found in the Plateau area north of Comayagua, but commercial petroleum seems unlikely.

REPUBLIC'S WHO'S WHO IN OIL EQUIPMENT

A few of the leading oil equipment manufacturers whose products are available through Republic's 45 sales and service points in Arkansas, Illinois, Indiana, Kansas, Louisiana, Mississippi, New Mexico, Oklahoma and Texas . . . Abegg & Reinhold Company, Ltd. . . . Alemite Division (Stewart Warner Corporation) . . . American Iron & Machine Works . . . American Manufacturing Company . . . American Rolling Mill Company . . . American Chain and Cable Company . . . American Fork & Hoe Company . . . Baash-Ross Tool Company . . . Babcock & Wilcox Tube Company . . . Baker Oil Tools, Inc. . . . Band-It Company . . . Beaver Pipe Tools, Inc. . . . Black, Sivalls & Bryson . . . Byron Jackson Company . . . Cameron Iron Works, Inc. . . . Chain Belt Company . . . Chicago Nipple Manufacturing Company . . . Chicago Pneumatic Tool Company . . . Clark Bros. Company, Inc. . . . Columbus McKinnon Chain Corporation . . . Crescent Tool Company . . . W. H. Curtin & Company . . . Darling Valve & Manufacturing Company . . . Dresser Manufacturing Company . . . E. I. Du Pont de Nemours & Company . . . Henry Disston & Sons Company . . . Eagle Picher Company . . . Fairbanks, Morse & Company . . . Fisher Governor Company . . . Foster Cat Head Company . . . Gates Rubber Company . . . The B. F. Goodrich Company . . . H. P. Gott Manufacturing Company . . . Graybar Electric Company . . . The Guiberson Corporation . . . Hinderliter Tool Company . . . Chas. N. Hough Manufacturing Company . . . Hughes Tool Company . . . Inferno Company . . . International Derrick & Equipment Company . . . The S. M. Jones Company . . . Ladish Drop Forge Company . . . Larkin Packer Company . . . Link-Belt Company . . . Lubrikup Company . . . The Lufkin Rule Company . . . McKissick Products Corporation . . . McNeely Materials Company . . . Manning, Maxwell & Moore, Inc. . . . F. E. Meyers & Bros. Company . . . Mission Manufacturing Company . . . W. C. Norris, Manufacturer . . . Walter O'Bannon Company . . . Oil Center Tool Company

CUBA—The BAHAMAS

OIL FIELDS IN CUBA

MOTEMBO, Santa Clara (Las Villas) Province—The Motembo field, which was discovered around 1880, produces natural gasoline from the Serpentine formation in the Upper Eocene. The structure is a Monocline igneous barrier accumulation with pay depths ranging from 600 to 1800 feet. Out of a total of approximately 1225 wells drilled in the field, there are about 200 producers. The field has been exploited by numerous operators. One of the most recent claims to become active is the Faust Claim of Centralia Naphtha Company. The San Juan and San Elias claims, operated by Compania Minera San Elias, S. A. and Motembo Mining Company, S. A. are also reported active. The field has a productive area of about 85 acres with the production being between 59 and 61-gravity.

Bacuraneo, Habana Province—The Bacuraneo field produces an asphaltic type of crude from the Habana sand and shale in the Upper Cretaceous with producing depths ranging from 400 to 1200 feet. The field is another Monocline igneous barrier accumulation. Crude oil and asphaltic seepages were discovered about 1860 by the soundings in the rock crevices. Drilling was started in 1915 and by 1917 Union Oil Company, S. A., principal lease holder in the field, had produced about 17,185 barrels of crude oil. About 60 wells have been drilled to date.

Jarahueca, Santa Clara (Los Villas) Province—The most recent serpentine discovery in Cuba is the Jarahueca field opened in 1943. This field produces 45-gravity oil from an average depth of about 1500 feet. To date there have been about 35 tests drilled in the field and 25 are producing with the average daily output being about 290 barels. There are five individuals or companies active in the Jarahueca field including Antonio Mondez, Antonio Mendez (Caribe), Petrolera Jarahueca, Parker "Iris" and Vieites "Regina." Approximately 200 barrels daily of Jarahueca crude are refined in the field by Petrolera Jarahueca which has a small skimming plant.

Wildcat Drilling in Cuba

PROVINCE, COMPANY, WELL	Total Depth	Year Completed	Formation Finished in
PINAR DEL RIO:			
S. O. Cuba's Rojas 1	3441	1945	Lower Miocene.
S. O. Cuba's Guanal 1	2147	1944	Lower Miocene.
S. O. Cuba's Guanal 1-A	3212	1945	Dibase.
S. O. Cuba's Banos 1	8605	1945	.....
Taco Taco's Well 1	4008	....	U. Cretaceous.
Candelaria 1 (operator not known)	4015	....	Serpentine.
Hannah Pet.'s El Kaiser 1	2136	1939	L. Cretaceous.
Hannah Pet.'s El Kaiser 2	2500	1942	L. Cretaceous.
Estrella's Chacon 1	3255	1939	.....
Atlantic's Prosperidad 1	2283	1940	Cretaceous.
HABANA:			
Atlantic's Marta 1	3288	1941	Andesite.
Estrella's Ariguanabo 1	5272	1939	.....
Estrella's Ariguanabo 2	10036	1939	.....
Estrella's Guira 1	3646	1942	.....
Estrella's Guira 2	400	1942	.....
Estrella's Murga	2750	1943	.....
San Lorenzo's Well 1	3005	1925	L. Eocene.
Antillean's Bejucal 1	3228	(Before 1937)	Cretaceous.
Brown's Well 1	....	1939	Mio.-Cretaceous.
Estrella's Rio Hondo 1	899	1942	.....
Estrella's Rio Hondo 2	2466	1943	.....
Estrella's Copey 1	2924	1942	.....
Antillean's Baldspot 1	2100	....	Serpentine Igneous.
Antillean's Georgian 1	3006	....	L. Eocene.
Estrella's San Blas 1	3691	1943	.....
Madruga's Well 1	2604	(Before 1929)	Cretaceous.
MATANZAS:			
Atlantic's Siboney 1	5263	1941	Cretaceous.
Atlantic's Grace C-1	4104	1940	Cretaceous.
Atlantic's Grace C-2	4018	1940	Cretaceous.
Estrella's Mercedes 1	4018	1939	.....
Estrella's Mercedes 7	2310	1939	.....
Atlantic's Criolla 1	6020	1939	Cretaceous.
SANTA CLARA:			
Atlantic's Puntilla 1	4034	1939	Cretaceous.

NOTE: All tests were abandoned.

CUBA OIL PRODUCTION

During 1945, the three fields in Cuba produced a total of 171,900 barrels. The distribution was Jarahueca, 105,700 barrels; Montembo, 65,500 barrels, and Baruraneo, 700 barrels. Cumulative output by fields to the end of 1945 was Jarahueca, 151,556 barrels; Motembo, 932,446 barrels, and Baruraneo, 145,903 barrels. Daily average production in Cuba during 1945 was about 475 barrels.

ACTIVITY IN THE BAHAMAS

The search for oil in the Bahamas, where no production has yet been established, is under way on a large scale. Seven companies have acquired oil exploration licenses totaling 47,399 square miles (30,335,360 acres) and two other companies have applied for such licenses. The areas acquired include the waters surrounding the Bahamas.

Companies holding licenses include Anglo-Bahamian Petroleum Company, Ltd. (Anglo-Iranian Company), 12,925 square miles (8,272,000 acres); Bahamas Oil Company, Ltd., (Superior Oil Company of California), 8996 square miles (5,757,440 acres); Standard Oil (Bahamas) Ltd., (Standard Oil Company, New Jersey), 8474 square miles (5,423,360 acres); British Bahamian Oil Development Company, Ltd., (Central Mining & Investment Corporation), 6434 square miles (4,117,760 acres); Shell Overseas Exploration Company, Ltd., (Anglo-Saxon Petroleum Company), 5392 square miles (3,450,880 acres); Bahamas Oil Exploration Company, Ltd., (Gulf Exploration Company), 3676 square miles (2,352,640 acres); and Nassau Oil Mining Company, Ltd., (local company), 1502 square miles (961,280 acres).

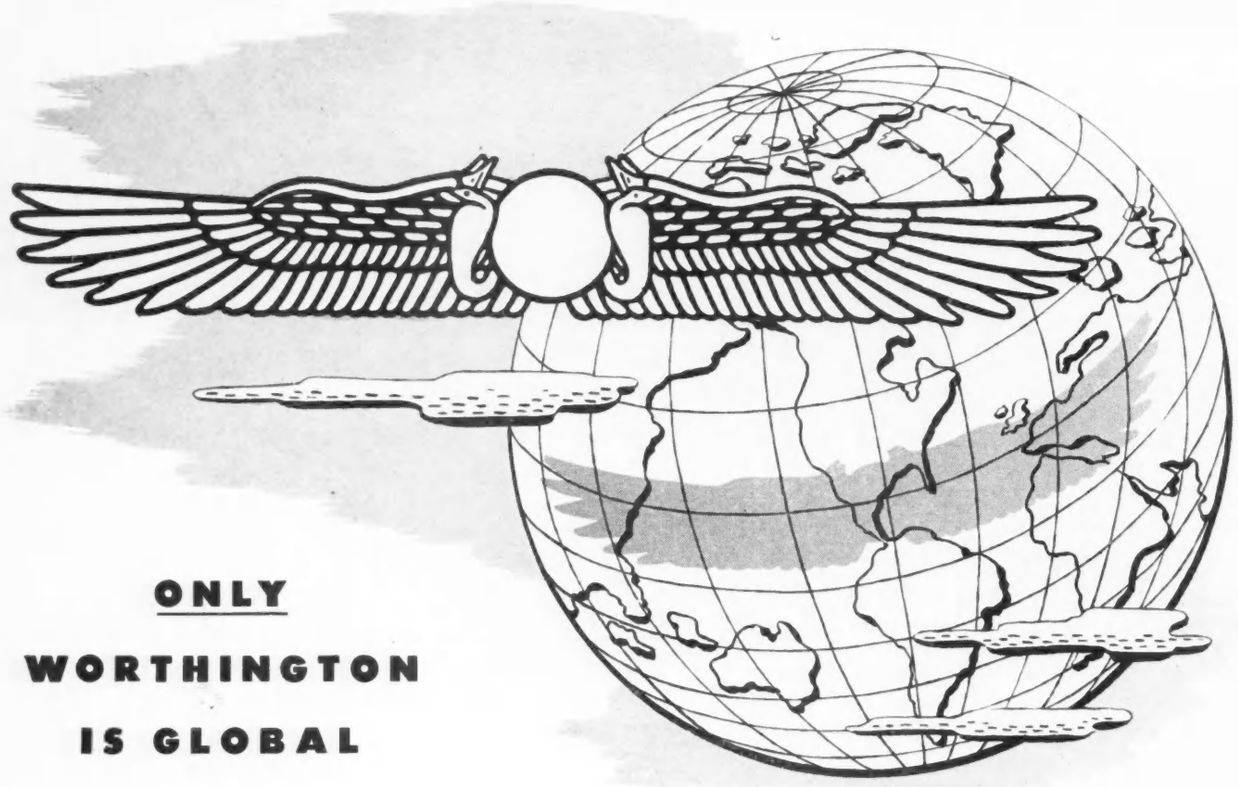
The applications of Bahamas Mining Company, Ltd., and Texas Petroleum Company, Ltd., (The Texas Company), were last reported under consideration.

The Bahamas Oil Company, Ltd., (Superior) has set up permanent headquarters in Nassau and are preparing to drill the first wildcat test in the Bahamas. Location was staked in November, 1945, for a test in the approximate center of the northern end of Andros Island. Material has been moved in and the projected depth is 10,000 feet. The company has been engaged in gravity work both over water and on land. One crew has been engaged in the west end of Andros Island. Seismograph operations have been conducted in the Bimini Islands (lying between the main Bahama group and the mainland).

Standard of New Jersey has a gravity crew on Grand Bahama Island which is located on the west end of the Bahama group of islands. Anglo-Bahamian is moving in equipment for work in their concession at the south end of Andros Island. Shell also is reported moving in geophysical crews.

Refineries of Cuba

COMPANY	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Standard Oil Co. of Cuba, Apto. 1303, Havana	Belot	4,200	2,100	S-C-L-A	Operating.
Cia. Cubana de Petroleo, S. A. Havana	Havana	500	None	Skimming	Operating.
Petrolera Jarahueca	Jarahueca Field.	200	None	Skimming	Operating.



ONLY

WORTHINGTON

IS GLOBAL

In Complete Sales and Service Facilities

Worthington supplies more compression and refrigeration equipment to the petroleum industry — throughout the world — than all other manufacturers combined! . . . Here's a fact that speaks volumes, not only for product-excellence, but for the many added advantages of a world-wide sales and service organization. Only Worthington brings such an organization — complete and co-ordinated — to every area where oil is produced or processed.

Moreover, the international character of this far-flung network cuts through a host of import regulations. Worthington's huge factories in England, France, Italy and Spain supply many foreign oil lands where trade restrictions bar the entry of American-built machines. And wherever Worthington equipment goes, you are sure to find Worthington service.

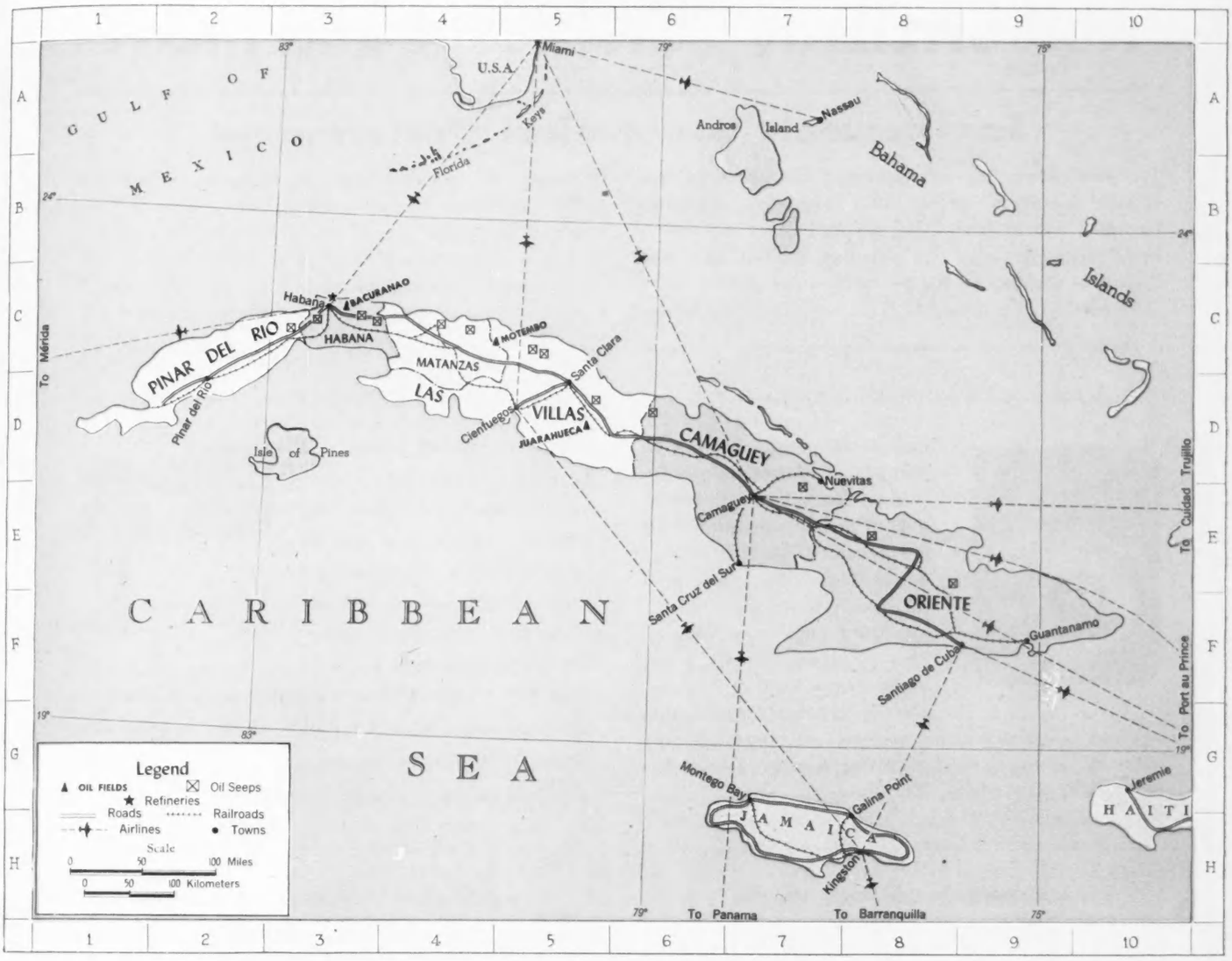
This service is the outgrowth of more than a century's experience producing liquid-and-gas-handling equipment. It is backed by a technical staff skilled in research and development, and by the greatest productive capacity in the field. It covers a broad diversity of products vital to the petroleum industry, ranging from pipeline pumps and valves to turbines, condensers, Diesel and gasoline engines and other power plant essentials.

That's one of the many reasons why *there's more worth in Worthington* . . . why the Worthington wings-trademark is recognized the world over as a symbol of first-rate engineering, functioning through global sales and service facilities. Oil men everywhere are invited to make full use of these facilities for ready assistance in production and processing problems. *Worthington Pump and Machinery Corp., Harrison, N. J., U.S.A.*

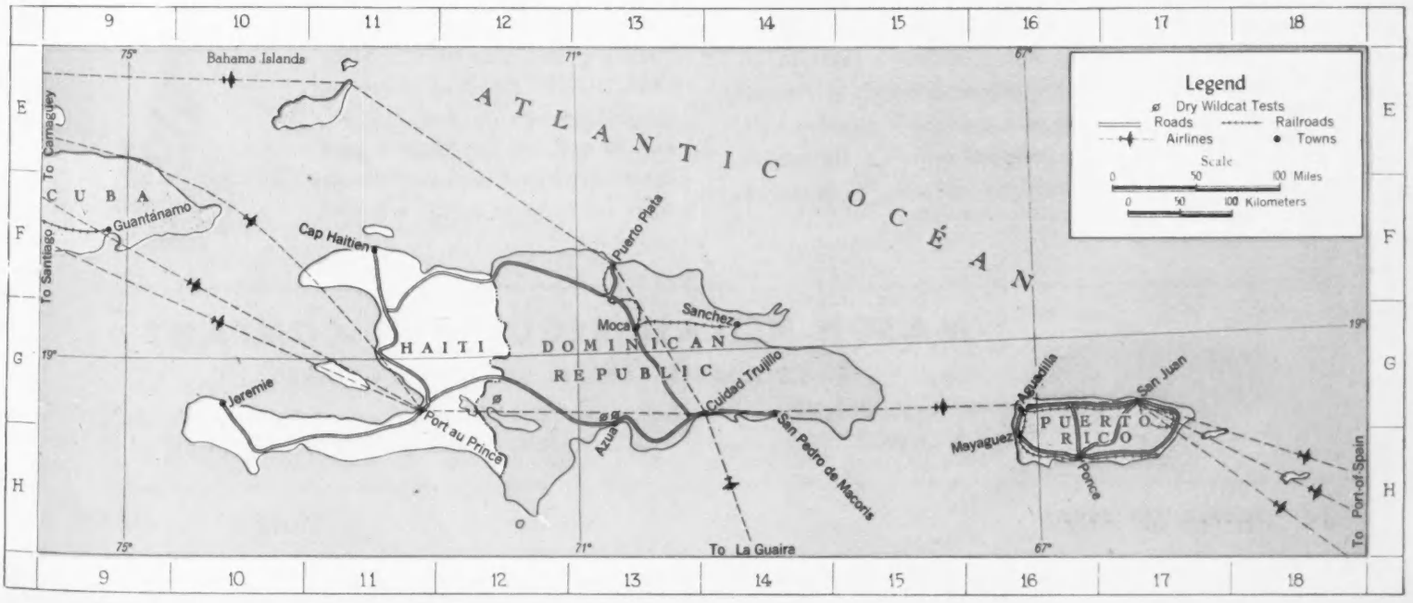
WORTHINGTON

THE SIGN OF VALUE AROUND THE WORLD

CUBA



DOMINICAN REPUBLIC—HAITI



MASONEILAN CONTROL EQUIPMENT

For Accurate Economical Performance

The Masoneilan line of Automatic Control Equipment includes all types necessary for measuring, indicating, recording and/or controlling pressure, level and flow in recycling plants, pipe line pumping stations and other operations incident to the production and distribution of petroleum and its products. This equipment has proved its value, economy and safety in numerous applications in the field where it is preferred by many engineers. Controls for many pipe-line pumping stations, for instance, have been completely engineered by Mason-Neilan. This engineering experience and the high quality of Masoneilan equipment is your assurance of satisfactory performance.

MASONEILAN PRESSURE INSTRUMENTS

Include recorders with one to four pens, and indicating or recording controllers with single, dual or drift compensation. All are accurate, sensitive instruments of latest design and highest quality which offer several important exclusive features. May be equipped with pneumatic transmitting systems, electric switches for operating solenoid valves and signal systems, etc. Universal type cases for surface or flush mounting. Ranges between 30" Mercury Vacuum and 10,000 pounds.

MASONEILAN LIQUID LEVEL CONTROLLER

Masoneilan 12,000 Series . . . Displacement type for all level control applications including interface service and remote level indication. The new type control mechanism provides extreme sensitivity. Case mounting can be reversed in the field from left to right without additional parts. Available in standard ranges from 14 inches to 15 feet. In addition to model 12,600 shown, types are available with internal displacer for top or side mounting.

MASONEILAN CONTROL VALVES

A wide variety of types available for high or low pressure work including single seated, balanced, angle types particularly suitable for bypass lines from pump discharge to pump suction, as well as standard double seated types. All are of latest design and proved performance. Many exclusive features including the unique Masoneilan manual operating and position indicating unit. May be equipped with air fin bonnet if required for extreme temperature service.

MASONEILAN PRESSURE REGULATORS

Direct and pilot operated types for all services. Useful anywhere reducing valves or back pressure regulators of highest quality and accuracy are required. These regulators are responsive and accurate, and require minimum attention. They are available in a number of models with standard controlled ranges between ½ and 150 psi, and 10 and 260 psi. Their rugged construction and low maintenance costs allow them to be installed anywhere.

MASONEILAN

MASON-NEILAN REGULATOR COMPANY

1182 ADAMS STREET, BOSTON 24, MASS.

New York Philadelphia Pittsburgh Toledo Chicago Tulsa Atlanta St. Louis Houston
Los Angeles San Francisco Mason Regulator Co. of Canada, Ltd., Montreal, Canada

DOMINICAN REPUBLIC—HAITI

CONCERTED efforts of United States oil interests to open commercial oil production on the island of Hispaniola —the east two-thirds of the island being Santo Domingo and the west one-third being Haiti—have failed so far. Exploratory work is continuing and both countries probably will receive additional wildcat tests during 1946.

Since 1939 the drilling in the Dominican Republic has been conducted by Seaboard Dominicana Company, a partnership venture between Seaboard Oil Company of Delaware and Standard Oil Company (New Jersey), under supervision of the latter firm. The company is operating on concessions originally obtained by Harold C. Bishop.

Through 1945, Seaboard Dominicana had drilled 13 wildcat tests in Santa Domingo, with most of these tests being located in the area adjacent to the town of Azua.

Exploratory work in Haiti is being conducted by The Atlantic Refining Company. This company controls approximately 500,000 acres of concessions in Haiti, made up of ten exploitation blocks. The company has drilled two dry holes on the concession. The drilling of these tests by Atlantic followed several months of core drilling in the St. Marc area, along the west coast. Work was continued during 1945 in the Cul-de-Sac Valley.

GEOLOGICAL DATA

The regional geology of the island of Hispaniola is somewhat similar to that of Cuba and Porto Rico. The strata are highly compressed and folded. The section consists of rocks of Tertiary Age, with some metamorphosed Cretaceous, and possible metamorphosed Paleozoics, exposed in the mountains. Igneous rocks are present in all of the mountain ranges.

Recent formations overlie Miocene rocks, and are made up mainly of coarse gravel in the interior and massive reef limestone along the coast. The Miocene strata consists mainly of sand and conglomerate at the top, coral limestone in the middle, and marls and sand in the lower section. Oligocene strata are made up of an upper limestone, a middle section of conglomerate and sand, and a lower section containing black carbonaceous shales. The underlying Eocene is largely limestone and shale. The Cretaceous rocks are generaly badly controlled with metamorphosed shales, slates and serpentines.

HAITI WELL DATA

Two wells have been drilled by The Atlantic Refining Company in the Department De L'Artibonite:

JURINET 1: Located 50 miles north-northeast of Port-Au-Prince, elevation 1316 feet. Spudded January 30, 1944, abandoned August 23, 1944, at total depth of 7005 feet. The test started in Middle Miocene and bottomed in Lower Oligocene. This test now is being deepened.

MAISSADE 1: Located 47 miles north-northeast of Port-Au-Prince, elevation 952 feet. Spudded September 10, 1944, abandoned November 13, 1945, at total depth of 9010 feet.

SANTO DOMINGO WELL DATA

Maleno Structure: Slightly assymetrical anticline, steep flank on south; axial trend west northwest; Lower Miocene at crest. Structure lies approximately 14 kilometers northwest of Azua. This structure was first drilled in 1933 by Interocean Oil Company. Interocean No. 3 was abandoned at 2826 feet after finding a slight show of oil. Seaboard Dominicana Company entered the area in 1939, drilling two tests that year. The Maleno 1 was completed at 1197 feet and from July, 1939, to May, 1940, flowed 12,966 barrels of 19.9-gravity oil before being abandoned. This well started in the Lower Miocene and topped the Upper Oligocene at 745 feet. The Maleno 1-A was drilled to 3033 feet and produced 4553 barrels of 19.9-gravity oil from July, 1939, until May, 1940, when it was abandoned. Upper Oligocene was topped at 581 feet and Middle Oligocene at 2955 feet. Five shallow dry holes were drilled by the company in 1943.

Higuerito Structure: Completely folded and faulted anticline lying immediately in front of the thrust fault on the south side of the Cordillera Central. Oldest beds at surface all Upper Oligocene. Structure lies 10 kilometers north of Azua. First oil exploration in Santo Domingo was conducted on this structure. Between 1904 and 1908, Lancaster and Krieder drilled five dry holes, the deepest being 935 feet. Interocean Oil Company drilled dry holes in 1919 and 1922. The Texas Company's only test on Hispaniola was drilled in this area in 1928 with the test being abandoned at 2893 feet. Seaboard Dominicana drilled dry holes in 1943 and 1944 with the deepest test going to 3459 feet. The Higuerito 1 topped the Middle Oligocene at 2414 feet and has slight shows of oil and gas.

Quita Coraza Structure: Large east-west trending assymetrical anticline, steep flank on north, with Upper Oligocene at crest. Lies approximately 40 kilometers west of Azua. Only test drilled on this structure was by Seaboard Dominicana in 1940. The test topped the Middle Oligocene at 3101 feet and was abandoned at 4300 feet.

El Mogote Structure: Small domal shaped anticline with Middle Miocene at crest. Lies approximately 25 kilometers west of Azua. Seaboard Dominicana drilled its El Mogote 1 to 7505 feet, which was abandoned in June, 1940.

Las Hormigas Structure: Small east-west trending assymetrical anticline, Middle Miocene at crest. Lies approximately 25 kilometers northwest of Azua. Seaboard Dominicana's Las Hormigas 1 was abandoned in November, 1940, at 5070 feet after encountering some gas shows.

Comendador Structure: Large west-northwest ending assymetrical anticline, steep fault on north, with Upper Oligocene at crest. Seaboard Dominicana's Comendador 1 was abandoned at 5896 feet in February, 1945. Formation tops were Middle Oligocene 765 feet, Middle Eocene 4467 feet.

(Cooperation of J. M. Troncoso, Secretario de Estado del Trabajo y Economia Nacional, Ciudad Trujillo, D. R. and the Secretairerie D'Etat des Relations Exterieures, Republique D'Haiti, Port-Au-Prince, Haiti, is gratefully acknowledged).

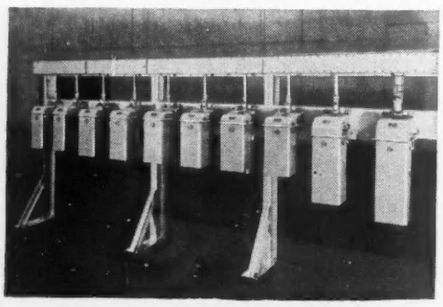
TRAVEL ACCOMMODATIONS

There are both air and water transportation from the United States to Port-au-Prince, Haiti, and Ciudad Trujillo, Santa Domingo, principal cities on the island. Steamship companies operate regular passenger schedules from Houston, New Orleans, and New York. Both Pan American Airways and KLM (Dutch) operate air service out of Miami to the islands.

* * *

The cooperation of J. M. Troncoso, Secretario de Estado del Trabajo y Economia Nacional, Ciudad Trujillo, Distrito de Santo Domingo, Dominican, and also of the Secretairerie D'Etat des Relations Exterieures, Republique D'Haiti, Port-au-Prince, Haiti, is gratefully acknowledged.

Eleven G-E combination air-break starters for Class 1, Group D hazards controlling G-E explosion-proof pump motors in a gas-cycling and repressuring plant.



Arriving ready for installation in Class 1, Group D location, rack assembly of G-E oil-immersed 440 volt combination starters. Suitable for motors up to 100 hp, these starters operate with all contacts at least six inches under oil.

GENERAL ELECTRIC solves a housing problem in hazardous areas

Explosion-proof motors and suitable control eliminate the need for special isolation to meet hazards—both *explosion* and *corrosion.*

Whether it is high-octane gasoline, toluene, natural gas, acid fumes, or outdoor service, there is a way to meet your conditions with a combination of G-E motors and control. For General Electric builds the most complete line of motors and control devices for use in Class 1 as well as Class 2 locations. Thousands of installations attest General Electric's rigid standards of precision and workmanship in the design and manufacture of explosion-proof motors and control. International General Electric Co., Inc., Schenectady 5, New York, U.S.A. OE-6-1

(Products of General Electric Co., U.S.A.)

GENERAL ELECTRIC

Printed in U.S.A.
THE OIL WEEKLY

ARGENTINA

Legend
OIL FIELDS
Refineries
Pipe Lines
Roads
Railroads
Airlines
Towns
PROVEN OIL AREAS
PROBABLE OIL AREAS
POSSIBLE OIL AREAS
Scale
0 50 100 200 Miles
0 50 100 200 Kilometers
BOLIVIA
PARAGUAY
BRAZIL
URUGUAY
PACIFIC OCEAN
ATLANTIC OCEAN
CHILE
JUJUY
SALTA
FORMOSA
EL CHACO
MISIONES
CORRIENTES
SANTIAGO DEL ESTERO
TUCUMAN
CATAMARCA
LA RIOJA
SAN JUAN
CORDOBA
SANTA FE
ENTRE RIOS
SAN LUIS
MENDOZA
LA PAMPA
BUENOS AIRES
NEUQUEN
RIO NEGRO
CHUBUT
SANTA CRUZ
Asuncion
Corrientes
Resistencia
Posadas
Reconquista
Rafaela
Santa Fe
Parana
San Lorenzo
Campana
Buenos Aires
La Plata
Montevideo
Mar del Plata
Necochea
Bahia Blanca
Carmen de Patagones
Viedma
Rawson
Trelew
Comodoro Rivadavia
CALETA OLIVIA (O-12)
Pto. Deseado
Canadon Leon
Rio Chico
Sta. Cruz
Lago Buenos Aires
Esquel
San Carlos
Neuquen
PLAZA HUINCUL FIELDS
MENDOZA FIELDS
Mendoza
Tunuyan
Santiago
SOSNEADO
RANQUIL
Jachal
San Juan
La Rioja
Catamarca
Tinogasta
Po. de S. Francisco
Tucuman
Salta
Jujuy
Pocitas
Blanca
Vespucio
Hickman
Oran
Elordi
SALTA FIELDS
To Antofagasta
Rio Cuarto
Mercedes
San Luis
Cordoba
Telen
Sta. Rosa
Tropic of Capricorn
La Plata River
CONTINUATION SOUTHERN ARGENTINA
Lago Argentino
SANTA CRUZ
Gallegos
Sta. Cruz
Punta Arenas
Rio Grande
TIERRA DEL FUEGO
Ushuaia

Performance Proved On The World's Deepest

Drilling the world's deepest oil well to 15,279 feet put Union Wire Rope to many a test. Probably the toughest test came at 12,829 feet, where chert, almost as hard as steel was encountered. It took 4 months and 157 round trips with the drill pipe to get through it. This 125 foot chert section accounted for more than a third of the wire lines used to drill the world's deepest well.

Once again, Union Wire Rope has demonstrated its toughness, strength and longer lasting qualities. The finest quality steel, made into rope by the *Pre*formed method under the close supervision of wire rope specialists is the combination which gives you maximum efficiency; saves you both money and down-time.

When you need *Pre*formed wire rope, specify **union-formed.**

UNION WIRE ROPE CORPORATION
2108 Manchester Ave., Kansas City 3, Mo.

union-formed *Wire Rope*

IS PREFORMED TO OUT-PERFORM

Exclusive Export Distributor

LUCEY EXPORT CORPORATION

233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentina
San Fernando, Trinidad, B. W. I. ● 615 8th Avenue West, Calgary, Canada

ARGENTINA

GENERAL INFORMATION

THERE are four important oil producing regions in Argentina—Comodoro Rivadavia, Mendoza, Plaza Huincul and Salta, all being distinct units in the sense that they are widely separated and produce oil from sediments of different geologic ages.

The principal operating company in Argentina is Yacimientos Petroliferos Fiscales (Government Oil Fields) known as YPF. Starting in 1907, the production of YPF showed a gradual increase until 1920, after which a more rapid rise occurred with only temporary setbacks. The real advance in YPF production began in 1935 when it increased from slightly less than 6 million barrels annually to a peak of 16,560,947 barrels in 1943. During 1944 and 1945 production decreased slightly with total production in 1945 being 15,453,876 barrels.

Private companies did not produce oil in Argentina until 1916, but from 1931 to 1938 produced more than the government. Since 1943 the production of the private companies has declined gradually but steadily from a peak of 8,769,203 barrels to 7,421,741 barrels in 1945.

Most of the wildcat drilling is by YPF with the company completing 11 such tests in 1945.

Of a total area of 281,802,842 acres, 247,165,380 acres have been reserved for the government and hence are available only to YPF for exploration. Private companies have 116,260 acres under lease. The remainder, 34,521,200 acres, is "open," although there are great difficulties confronting private companies in obtaining leases on this "open" acreage.

There follows a discussion of each of the four oil-producing districts of Argentina:

COMODORO RIVADAVIA DISTRICT

The Comodoro Rivadavia oil district in the Territory of Chubut, in the southwestern part of Argentina on the South Atlantic Coast, is the most important producing area in the country. Until after 1925, it furnished practically all of the country's production, and even today it furnishes about two-thirds of the nation's crude output.

There are four operating companies in the Comodoro Rivadavia district with YPF being the largest and most active. Other companies are Diadema Argentina S. A. de Petroleo (Shell), "Astra" Companie Argentina de Petroleo S. A. (an Argentina company), and Compania Ferrocarrilera de Petroleo (Argentina Railways).

The principal fields of the Comodoro Rivadavia district include Costa, Escalante, Astra, Campamento Sud, Col. Sarimento and El Trebol in the province of Chubut, and Caleta Olivia (O-12), in the province of Santa Cruz, about 50 miles south of the main Comodoro Rivadavia production.

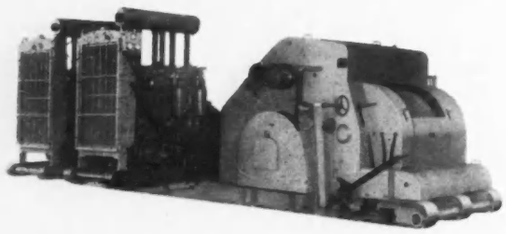
The Caleta Olivia (O-12) field, located on the south flank of the San Jorge basin, was discovered by YPF on June 26, 1944, and is the most important recent discovery made in Argentina. The discovery well made 1000 barrels of oil daily at 5381 feet from 10 feet of pay. There also were good oil showings found in four sands between 4085 and 4174 feet. The oil is of asphalt base, with no paraffin, and is considered superior to any oil developed in the regular Comodoro Rivadavia fields.

The restricted leaseholds in the Comodoro Rivadavia district of the private companies leave little opportunity for wildcatting by them in that area. Diadema (Shell) keeps three

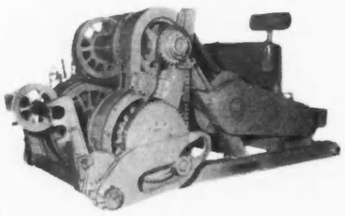
Engineering and Geological Data on Argentina Fields

FIELD AND PROVINCE	Location on Map Page 99	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						
				Name	Kind	Age	Depth of Wells (Ft.) Minimum to Top of Pay	Depth of Wells (Ft.) Maximum Total Depth of Wells	Avg. Thickness of Pay (Ft.)	Type Structure
Comodoro Rivadavia District, **Chubut**	L-4									
Costa	L-4	13,175	20	Glauconitico Chubutiano	Sand	Upper Cretaceous	1815	2805	30	Faulted Anticline
Escalante	L-4	17,700	23.5	Glauconitico Chubutiano	Sand	Upper Cretaceous	2260	4290	33	Faluted Anticline
Astra	L-4	12,355	22.3	Glauconitico Chubutiano	Sand	Upper Cretaceous	1750	3281	17	Faulted Anticline
Campamento Sud	L-4	200	20	Glauconitico Chubutiano	Sand	Upper Cretaceous	1917	2300	26	Anticline
Col. Sarmiento	L-4	20	23	Glauconitico Chubutiano	Sand	Upper Cretaceous	2310	2640	26	Faulted Anticline
El Trebol	L-4	10,250	23	Glauconitico Chubutiano	Sand	Upper Cretaceous	3878	5960	33	Faulted Anticline
Caleta Olivia (O-12), **Santa Cruz**	M-4	.....	30.6	.....	Sand	Jurassic	4085	5621	10	Faulted Anticline
Plaza Huincul District, **Neuquen:**										
Centro Octogono	I-3	150	32	Dogger	Sand	Jurassic	1880	1950	40	Monocline Unconformity
Oesta Octogono	I-3	1,800	31.5	Dogger	Sand	Jurassic	2300	2365	33	Monocline Unconformity
Laguna Colorada	I-3	510	33.5	Dogger	Sand	Jurassic	2450	2610	56	Monocline Unconformity
Bajo los Baguales	I-3	60	38.5	Dogger	Sand	Jurassic	3383	3386	20	Monocline Unconformity
Challaco	I-3	875	22.5	Dogger	Sand	Jurassic	3300	3425	66	Faulted Anticline
Salta District, **Salta:**										
Aguas Blancas	A-5	50	23	Calcareo y Gondwana	Sand Limestone	Permian	2300	3600	33	Anticline
Tartagal (Lomitos & Tranquitas)	A-5	625	43	Areniscas Superiores	Sand Limestone	Cretaceous	2140	3300	..	Anticline
Ramos	A-5	30	53.5	Gondwana y Devonico	Sand	Permian & Devonian	2900	3930	30	Anticline
Rio Pescado	A-5	.....	49	Terciario	Sand	Tertiary	4175	4376	103	Anticline
San Pedro	A-5	460	46	Areniscas Super. y Gondwana	Sand	Permian	1800	3300	60	Anticline
Mendoza District, **Mendoza:**										
Sosneado	F-3	150	12.9	Victor	Sand	Triassic	544	551	..	Mono. ign. Barrier
Tupungato	F-3	250	30	Victor	Sand Shale	Triassic	5870	6310	69	Anticline
Cacheuta	F-3	700	31	Victor C. y Potrerillos	Sand	Triassic	1940	3080	13	Mono. sealed at outcrop
Lunlunta (Barrancas)	F-3	.....	28	Potrerillos	Sand	Triassic	7720	7890	45	Anticline

"CARDWELL" DRILLING AND SERVICING RIGS



MODEL O—Twin-engine, double drum draw works for drilling to 8,000 feet with 4½" drill pipe. V-belts drive to pump and draw works. "Cardwell" chain transmission has three speeds forward and one reverse. Dual drum drives provide six speeds forward and two reverse to lower drum. Twin Disc friction clutches drive pump, draw works and rotary table. Engines and V-belts can be removed without disturbing bearing alignment.

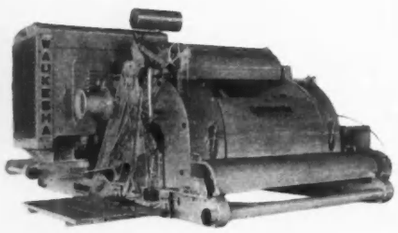


MODELS H, K or R—Combination rotary or cable tool (spudder or beam) double drum drilling rigs. Rotary drilling to 5,000 feet with 4½" drill pipe, cable tools to 7,500 feet, and servicing to 10,000 feet. Spudding assembly is interchangeable with rotary assembly in three to four hours on location. Beam and rotary can be installed on Models K and R, so changeover from rotary to cable tools or pumping can be made without rig changes. Friction clutch drives make it possible to "drill-up" through cave-ins, or lift tools without stopping spudder.

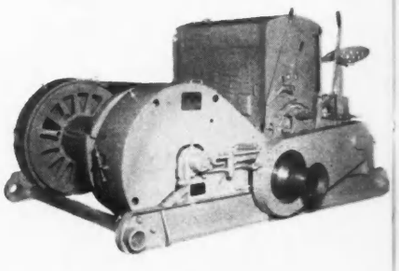
"CARDWELL" RIGS "FIT THE FIELD"

FOR BOTH ROTARY AND CABLE TOOL OPERATIONS

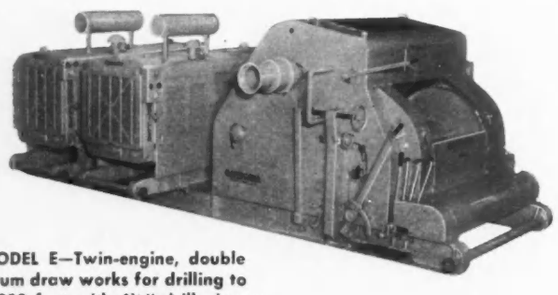
Heavy-duty brakes are self-energizing, full wrap type. Brakes have positive equalization, are fully adjusted by single turnbuckle, and the woven asbestos lining is interchangeable. Demountable brake flanges are heat-treated for surface hardness and ground to furnish a smooth, polished surface. All chains are Diamond long life, high efficiency type. Shafts are ground to close fits from heat-treated alloy steel. Every wearing part is heat-treated for longest wear. All "Cardwell" rigs are light weight, fully portable and designed to fit within road limits. Single and double leg servicing masts, double leg drilling masts, and telescoping alloy steel pipe portable derricks are available. Day and night parts service is available from conveniently located parts stock stores. Operating and maintenance instructions and fully illustrated parts books are included with each rig. Spanish and English books are available for machines shipped to Latin-American countries.



MODEL S—Single engine draw works for drilling up to 4,500 feet with 4½" drill pipe, or workover jobs to 10,000 feet. This rig is designed and built for fast drilling with one large engine which drives through "Cardwell" five-speed, even-step transmission. Dual drum drives furnish ten speeds forward and two reverse. Rotary table has five speeds. Engines up to 202 HP are available.



MODELS Q, H, K or S—Four sizes of single drum servicing hoists for wells 2,000 to 12,000 feet in depth. Positive jaw clutches and SKF bearings insure a free-rolling drum. Rotary table drive assembly is available for Models H, K and S; spudder available for Models H and K.



MODEL E—Twin-engine, double drum draw works for drilling to 6,000 feet with 4½" drill pipe or workover jobs to 12,000 feet. Friction clutch high drive outside of transmission permits fast lift of block without shifting gears. Six speeds and reverse to both drums, and five speeds to rotary table. Either or both engines may be used to drive draw works, rotary table or pump. When rotating, no chains are running except to table, although catheads or drum may be engaged through friction clutches without stopping table or pump. Main drive chains run in spray of oil. "Cardwell" patented single bearing power take-off for both engines insures bearing alignment.

MOBILHOIST—Self-propelled, rubber tired, combination rotary or cable tool drilling or servicing rig for drilling to 1,500 feet with rotary, 3,500 feet with cable tools or 4,500-foot servicing jobs. "Cardwell" five-speed and reverse transmission — heavy-duty power take-off and axles—dual wheels—jaw clutch in lower drum —hydraulically-operated friction clutch in upper drum. Spudder and rotary drive are available.

CARAVAN RIG—90-foot telescoping pipe derrick for drilling operations to 5,500 feet, or workover jobs to 10,000 feet. Derrick telescopes to one-half its length and is carried on semi-trailer with utility section. Engine operates hydraulic rams and winch for raising and extending derrick, and drives rotary table, light plant, washdown pump, air compressor, electric welder, and hydraulically raised telescoping doghouse. This is a complete portable drilling rig with which any draw works may be used. Rotary table and blocks are moved in place as a part of the derrick.

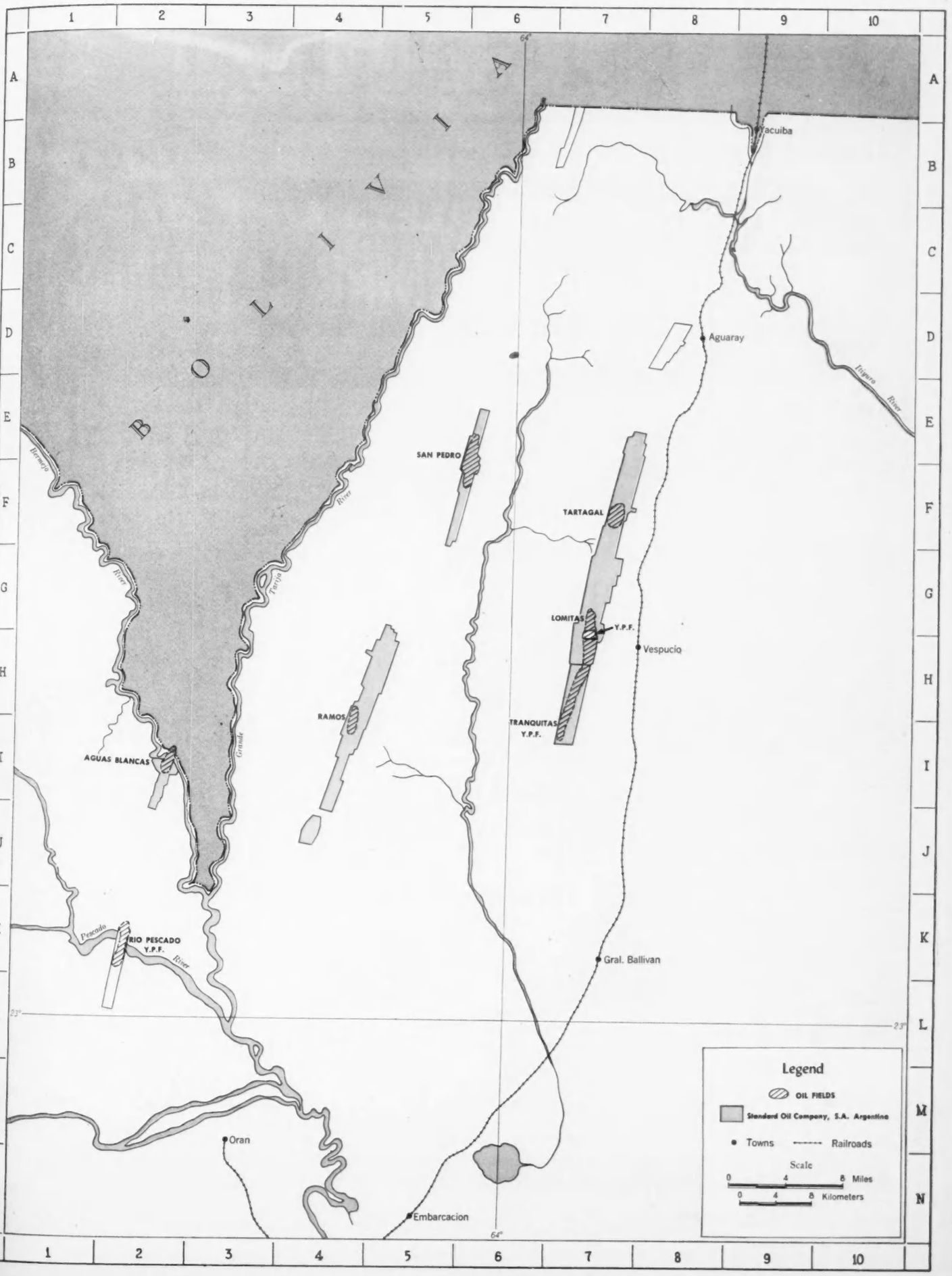
CARDWELL ALLSTEEL REG. U.S. TRADE MARK PAT. OFFICE
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

CARDWELL MFG. CO. INC.

FORMERLY ALLSTEEL PRODUCTS MFG. CO.
P. O. Drawer 2001 · Cable Addresses "ALLSTEEL", WICHITA - "CARDSTEEL", NEW YORK
Wichita, Kansas, U. S. A.

"CARDWELL" RIGS LAST LONGER AND REQUIRE FEWER REPAIRS

ARGENTINA—Salta Area



ANOTHER OUTSTANDING GEMCO FIRST!

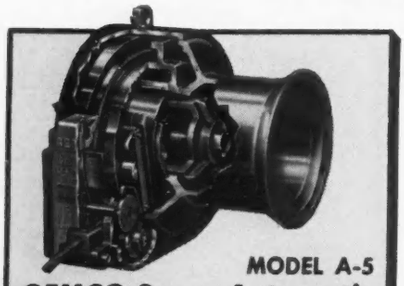
...thanks to GEMCO Research and Development

NOW! A COMPLETE LINE OF BREAKOUT and SPINNING CATHEADS OF ALL POPULAR TYPES...

FEATURING:

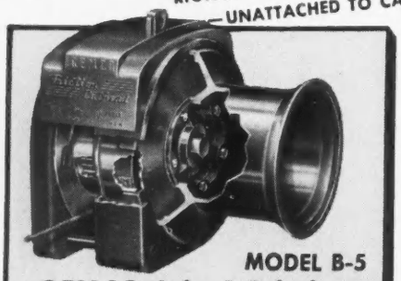
☆ STANDARDIZATION OF PARTS...
☆ INTERCHANGEABILITY OF UNITS...
☆ OPTIONAL OPERATING CONTROL...
MECHANICAL, HYDRAULIC, PNEUMATIC OR STEAM
RIGIDLY MOUNTED ON ANCHOR
—UNATTACHED TO CATHEAD

Look To **GEMCO** *for the Best in Cathead Equipment*



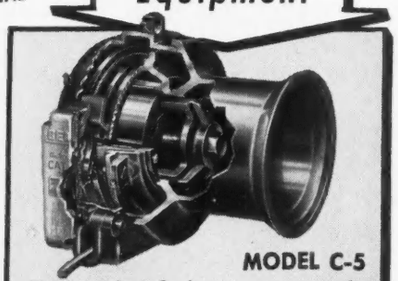
MODEL A-5
GEMCO Super Automatic

A fast, dependable, full automatic, positive clutch type Breakout. New, smoother performance with greater safety and economy. Long 42-inch stroke—the favorite for many years. Embodies many improvements. Interchangeable with other models.



MODEL B-5
GEMCO 3-in-1 Friction

A friction Clutch type Breakout, Spinner or Combination Unit. Can be used on either side of Drawworks. Has internal expanding clutch that requires no adjusting. Smooth, efficient and economical to use. Fully interchangeable with all other models.

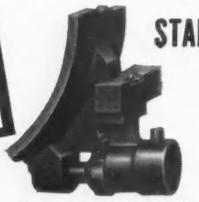


MODEL C-5
GEMCO Plain Automatic

This is a low cost Breakout unit with removable engaging shoulders. Automatic action. Full 42-inch stroke. Affords a smooth performance that sets a new standard for Catheads of this type. Interchangeable also with all other models.

THEY SET A NEW HIGH STANDARD IN PERFORMANCE, SAFETY, ECONOMY, DEPENDABILITY

STANDARD PARTS USED IN ALL GEMCO CATHEADS



Anchor with Optional Control—Hydraulic, Pneumatic or Steam

Shaft Adapter and Retainer Roller Bearings and Spool

Anchor—with Mechanical Control

SEE YOUR DRAWWORKS MANUFACTURER, SUPPLY STORE or WRITE US DIRECT

GEMCO OIL TOOLS
INCORPORATED

DEPT. WA • 3500 MAURY AVE. • ST. LOUIS 16, MISSOURI, U. S. A.

MODERN EQUIPMENT FOR THE OIL WELL DRILLING INDUSTRY

ARGENTINA—Continued

rigs running in its fields, two on new wells and one on reconditioning jobs.

On the other hand, YPF is very active in the Chubut-Santa Cruz region and during 1945 completed five wildcat tests with two additional tests active at the end of 1945.

The Comodoro Rivadavia district is situated within the geological province termed the San Jorge basin which was an important basin of sedimentation since early Cretaceous time. Production is found in the Horizonte Glauconitico, Horizonte Lignitifero, Horizonte Madre and Formacion Chubutiano in sandstone beds and lenses which are in part of continental origin, all of Upper Cretaceous age. Depths of producing formations range from 1750 feet to 5960 feet with the gravity of the oil varying from 19 to 23.5 degrees. In some of the pools there is close association between the oil-bearing and water-bearing sands which make the proper completion of wells slow and often very difficult.

PLAZA HUINCUL DISTRICT

The Plaza Huincul oil district is located in the Province of Neuquen and is composed of several small fields including Centro Octogono, Oesta Octogono, Laguna Colorado, Bajo los Baguales and Challaco. Oil was first discovered by the Argentine government in the Province of Neuquen in 1918.

Both YPF and Standard kept several rigs active in the Plaza Huincul district during 1945. YPF completed three wildcats and at the end of the year had two wildcat tests active in the district. Standard drilled one producer and one dry hole during the last quarter of 1945.

Production in the Plaza Huincul district ranges in depths from 1880 feet to 3425 feet with the gravity of the oil ranging from 22.5 to 38.5 degrees.

Challaco, discovered in 1940, is the most active field in the Plaza Huincul area. At the end of 1945 it had 63 producing wells and is only about one-third drilled up.

All of the producing fields in the Neuquen territory are small pools situated on the top or flanks of the Lotena-Challaco geanticline. This is a low, broad arch which extends for 200 miles across the southeastern part of the Neuquen sedimentary basin.

Surface rocks of the Neuquen producing fields in the Plaza Huincul district are Cretaceous and Tertiary, but production is from sand zones in the Jurassic. The petroleum found up to the present time has been obtained from sands lying immediately below an erosional unconformity in the Jurassic, in intimate contact with a highly bituminous marine, brown shale, of Tithonian (Jurassic) age. Some of the oil fields in this district appear to be stratigraphic traps. Thicknesses of the producing formations range from 20 to 66 feet.

MENDOZA DISTRICT

The Mendoza oil sector comprises four producing areas—Sosneado, Tupungato, Cacheuta and Lunlunta (Barrancas).

YPF completed one wildcat test in the district during 1945 and at the end of the year had two wildcat tests active.

Mendoza showed a rapid rise in development from 1938 to 1941 and since that time has maintained an annual output of about 3,100,000 barrels annually. Drilling depths in Ar-

Annual Crude Oil Production of Argentina
(In Barrels)

YEAR	YPF (Government)	Private Companies	National Total
1887–1913	.....	50,320	50,320
1907	101	.....	101
1908	11,454	.....	11,454
1909	18,800	.....	18,800
1910	20,713	.....	20,713
1911	13,096	.....	13,096
1912	46,936	.....	46,936
1913	130,411	.....	130,411
1914	275,471	.....	275,471
1915	513,138	.....	513,138
1916	816,316	48,880	865,196
1917	1,142,918	67,095	1,210,013
1918	1,242,816	108,698	1,351,514
1919	1,183,231	145,853	1,329,084
1920	1,428,805	222,282	1,651,087
1921	1,753,187	303,052	2,056,239
1922	2,194,506	670,577	2,865,083
1923	2,561,200	773,815	3,335,015
1924	3,484,163	1,274,821	4,758,984
1925	3,926,029	2,063,302	5,989,331
1926	4,678,659	3,172,003	7,850,662
1927	5,176,173	3,453,770	8,629,943
1928	5,413,199	3,657,377	9,070,576
1929	5,485,956	3,905,436	9,391,392
1930	5,208,202	3,793,461	9,001,663
1931	5,494,894	6,213,394	11,708,288
1932	5,674,555	7,463,563	13,138,118
1933	5,798,047	7,892,510	13,690,557
1934	5,255,698	8,769,204	14,024,902
1935	5,936,791	8,360,234	14,297,025
1936	7,171,801	8,286,157	15,457,958
1937	7,937,345	8,417,328	16,354,673
1938	8,998,468	8,077,769	17,076,237
1939	10,222,533	8,390,634	18,613,167
1940	12,474,655	8,134,505	20,609,160
1941	14,006,572	8,006,900	22,013,472
1942	15,382,736	8,321,425	23,704,161
1943	16,560,947	8,274,564	24,835,511
1944	16,205,360	8,024,273	24,229 633
1945	15,453,876	7,426,049	22,879,925

Comparative Activity, YPF and Private Companies

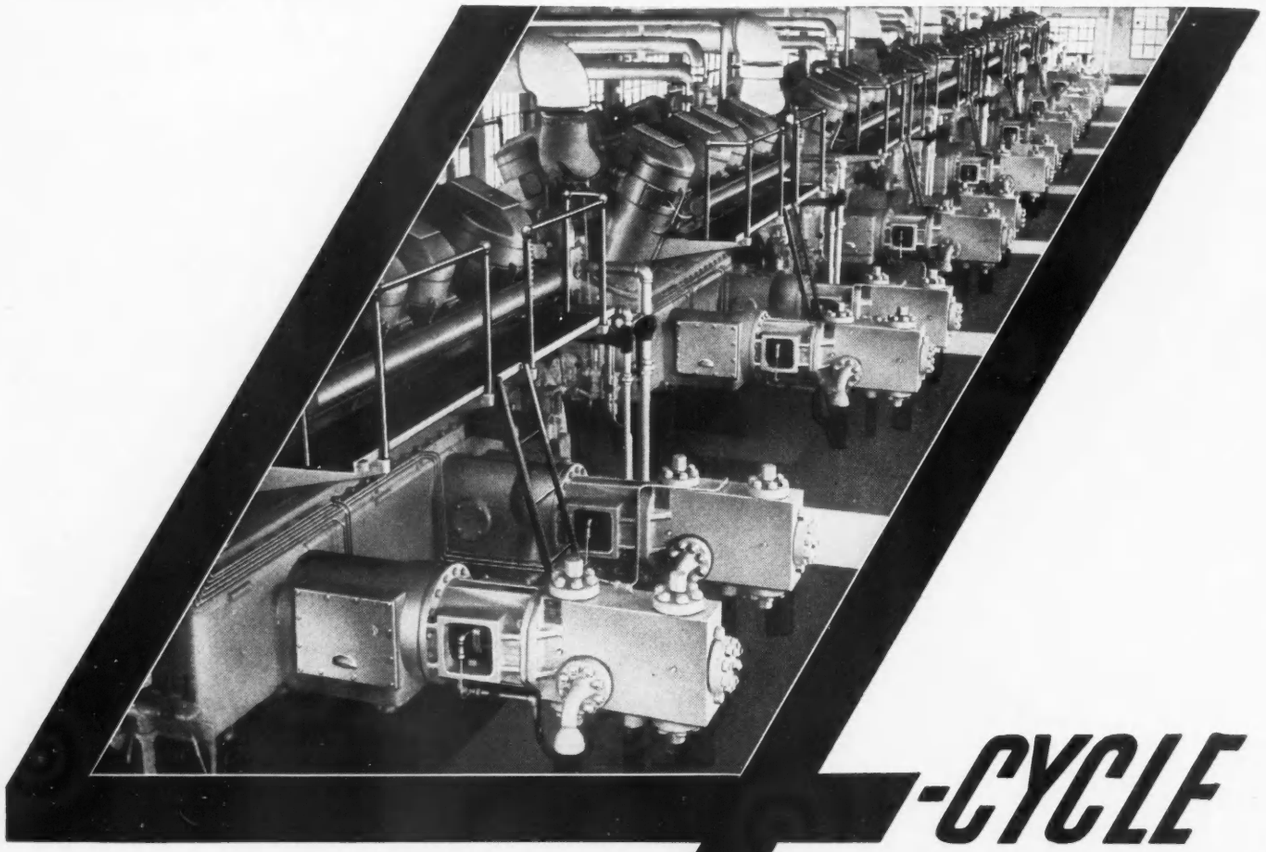
	PRIVATE COMPANIES				GOVERNMENT			
	Annual Production (in Barrels)	Feet Drilled	Wells Comp.	Wells Producing	Annual Production (in Barrels)	Feet Drilled	Wells Comp.	Wells Producing
1939	8,390,634	414,625	153	1278	10,222,533	652,533	164	1854
1940	8,134,505	347,680	120	1274	12,474,655	721,226	187	1950
1941	8,006,899	406,858	149	1356	14,006,572	878,568	226	2150
1942	8,321,425	460,568	162	1448	15,382,736	885,528	203	2355
1943	8,274,564	436,850	119	1426	16,560,947	656,528	144	2465
1944	8,024,272	363,109	122	1463	16,205,361	483,206	103	2490
Total	49,152,299	2,429,680	825	....	84,852,804	4,277,589	1,027	....
1945*	7,426,049	.....	.....	....	15,453,876	.....	.....	....

* Estimated.

Argentina—Crude Oil Production

	Como. Rivadavia		Plaza Huincul		Salta		Mendoza		Total		
	YPF	Private A	YPF	Private B	YPF	Private C	YPF	Private D	YPF	Private	Grand Total
Cumulative to 12/31/43	137,506,552	99,959,151	10,394,011	11,264,056	6,514,912	16,626,162	13,218,743	319,236	167,634,218	128,168,606	295,802,824
1944	10,226,615	6,875,895	1,923,249	445,005	961,665	682,081	3,094,396	21,292	16,205,360	8,024,273	24,229,732
1945	9,719,333	6,402,912	1,958,171	385,640	668,803	618,867	3,092,862	14,322	15,453,876	7,426,049	22,879,925
Cumulative to 12/31/45	157,452,500	113,237,958	14,275,431	12,094,701	8,145,380	17,927,110	19,406,001	354,850	199,293,454	143,618,528	342,912,481
Average Production Daily, December, 1945	25,481	13,008	5,881	1,006	1,478	1,698	8,674	38	41,514	15,750	57,264

A Includes Diadema (Shell), Ferrocarrilera and Astra. B Standard Oil Company. C Standard Oil Company. D Rio Atnel (El Sosneada).



4-CYCLE GAS-ENGINE COMPRESSORS

The 4-CYCLE V-ANGLE Line

Here is what Ingersoll-Rand 4-cycle V-angle design is bringing gas-engine operators and owners throughout the petroleum industry: flexibility of speed control . . . ability to handle surging pressure loads . . . simplicity . . . and overall operating economy (fuel, lubricating oil, maintenance, and attendance).

The *first* successful angle gas-engine compressors were 4-cycle . . . built by Ingersoll-Rand. Today this famous line includes 4 sizes of Type XVG, 75 to 300 hp . . . and 5 models of Type KVG, 600 to 1000 hp. Gas engines using the same power cylinders range from 185 to 1200 hp.

The 4-cycle V-angle line is serving cycling and pressure-maintenance systems, gas lift and gasoline plants, pipe lines, refineries, rubber plants, chemical plants, and industrial centers wherever gas is available for fuel.

Ingersoll-Rand

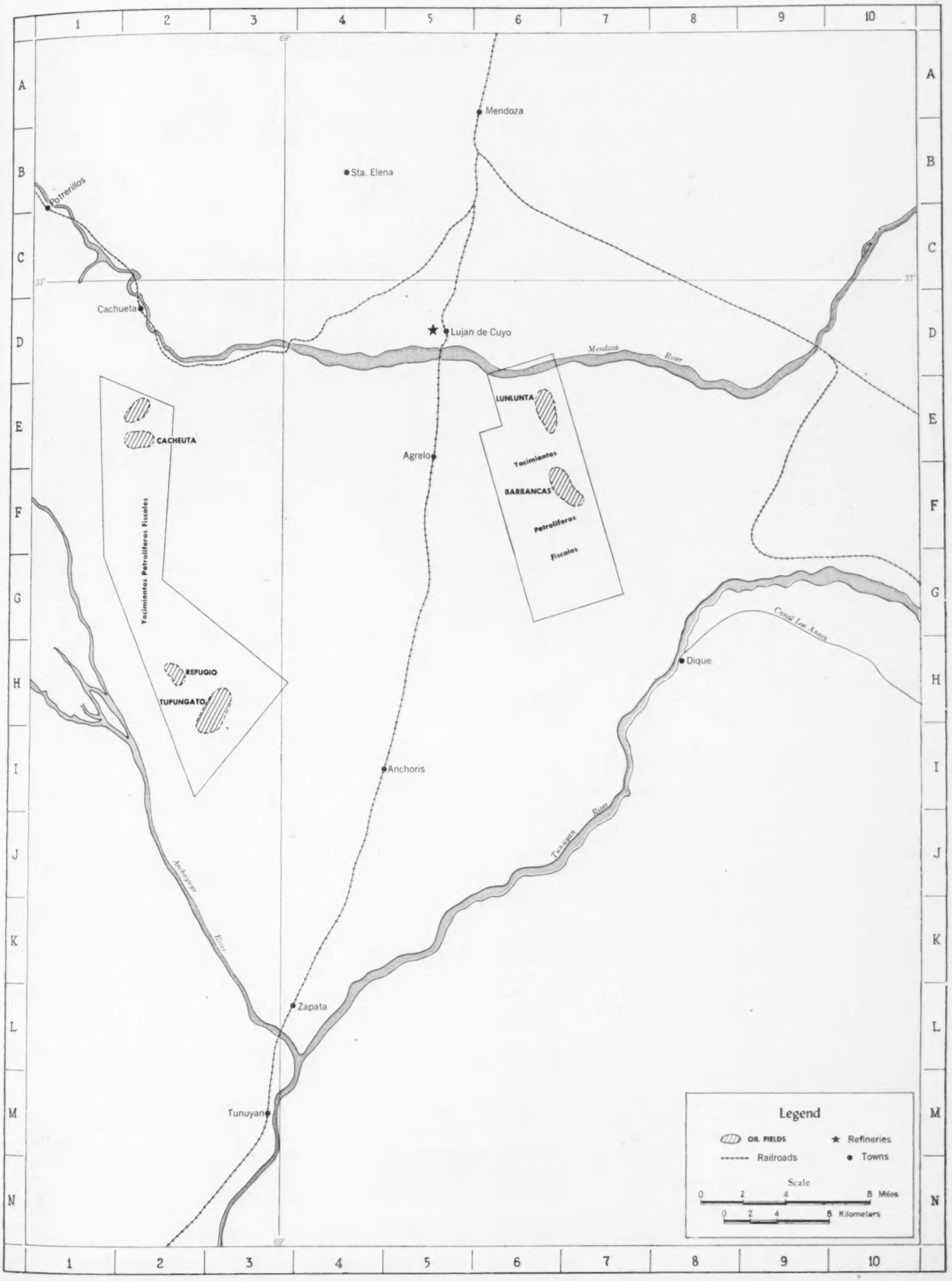
11 BROADWAY, NEW YORK 4, N. Y.

6-802

COMPRESSORS • TURBO BLOWERS
ROCK DRILLS • AIR TOOLS
CONDENSERS • CENTRIFUGAL PUMPS
OIL AND GAS ENGINES

IR

ARGENTINA—Mendoza Area

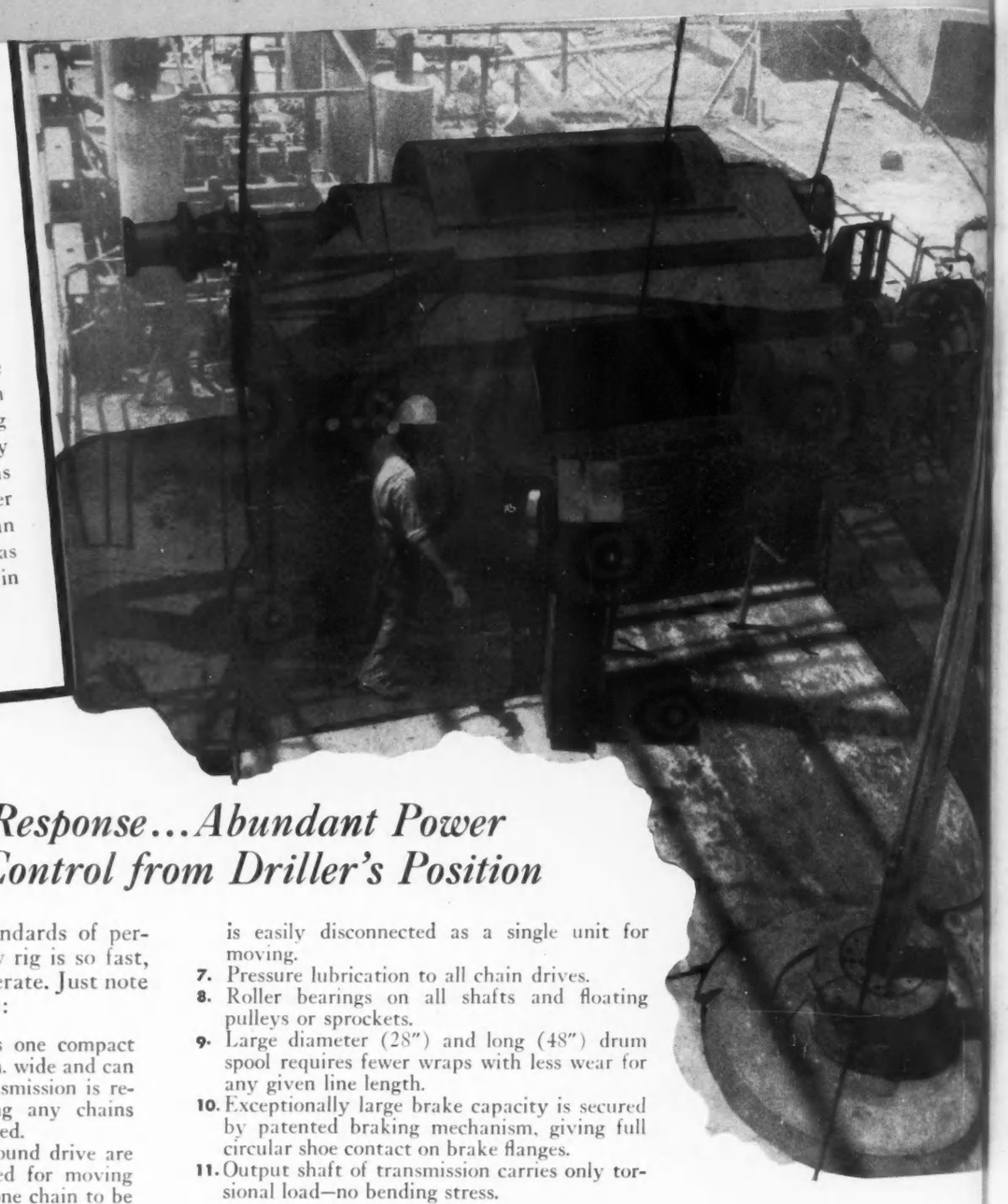


"OILWELL'S" *New* POWER RIG

FOR DEEP DRILLING

Designed the way *you* wanted it!

"Oilwell" Engineers took to the field to find out what the men who are responsible for drilling operations *really wanted*. They came back and built those ideas into this ultra-modern power rig, which performs with an ease and smoothness that has never before been attained in mechanical rigs.



Instant Response...Abundant Power ...Accurate Control from Driller's Position

. . . provides entirely new standards of performance. That's why this new rig is so fast, so safe and so economical to operate. Just note a few of its exceptional features:

1. Hoist with transmission forms one compact unit 21 ft. 6 in. long by 9 ft. 3in. wide and can be moved in ONE piece. Transmission is removable without disconnecting any chains when eight-foot width is required.
2. Hoist, three engines and compound drive are quickly and easily disassembled for moving as five major parts, with only one chain to be connected in rigging up.
3. "Airflex" friction clutches on high and low drum and rotary drives.
4. "Airflex" friction clutch couplings connect engines to compound drive.
5. ALL clutches including engine compound and pump clutches are air-operated from driller's position.
6. Air control hose lines between hoist and compound drive are grouped in a manifold which is easily disconnected as a single unit for moving.
7. Pressure lubrication to all chain drives.
8. Roller bearings on all shafts and floating pulleys or sprockets.
9. Large diameter (28") and long (48") drum spool requires fewer wraps with less wear for any given line length.
10. Exceptionally large brake capacity is secured by patented braking mechanism, giving full circular shoe contact on brake flanges.
11. Output shaft of transmission carries only torsional load—no bending stress.

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

Executive Office — Dallas, Texas
Division Offices—Columbus, Ohio
Dallas, Texas Los Angeles, Calif.

Export Division Office—
30 Rockefeller Plaza
New York 20, N. Y.

UNITED STATES STEEL

OIL WELL SUPPLY COMPANY · USS · OILWELL · UNITED STATES STEEL

"OILWELL"

gentina are the greatest in the Mendoza district and the wartime shortage of rigs and equipment has delayed a more aggressive development in recent years. Production in the Lunlunta (Barrancas) field ranges from 7720 feet to 7890 feet. In October, 1945, YPF completed its B-16 in the Lunlunta (Barrancas) field for 2500 barrels daily.

One of the earliest of the basins in the region of the Late Paleozoic mountain belt in South America lies in the province of Mendoza where, in the later part of the Triassic (Rhaetic), the sinking associated with the encroachment of the sea from the west permitted continental sediment of fluvial origin, admixed with large amounts of tuff and volcanic ash to accumulate to a thickness which, though highly variable, localy reaches more than 4600 feet.

The Mendoza oil fields are producing on folded structures all within 35 miles of the eastern base of the Andes. The oil in the various fields occurs at different horizons ranging from the weathered upper part of the underlying Triassic volcanic series up to a horizon relatively near the top of the Rhaetic and at least 2300 feet above the top of the Cacheuta shale, which is generally looked upon as being the most probable source of the oil occurring both above and below it.

In the Tupungato field, the one which has been most productive to date, the oil comes from fissures in hard volcanic tuff somewhat more than 1000 feet thick, with interbedded shales. The Cacheuta field owes its discovery to the encouragement to drilling offered by the asphaltic accumulations in the nearby outcrop of the Estratos de Cacheuta.

The Rhaetic beds which produce oil in the Mendoza district do not seem to have extended far, if at all, south of the province of Mendoza.

SALTA DISTRICT

Companies producing in this region are Yacimientos Petroliferos Fiscales and Standard Oil Company S. A. Argentina (Standard, New Jersey). Although YPF now is the largest producer in Salta, this is the only district in Argentine in which the cumulative oil production by private companies exceeds that of the government-owned company.

Wells in the Salta area are of low index of production, flowing light oil with large amounts of dissolved gas. The thickness of the sand formations are small with producing depths ranging from 2140 feet to 4920 feet. The deepest single producing field is San Pedro where the Standard Company is operating. This field was extended north in 1945.

During 1945, Standard drilled* two wells at Salta—one producer and one dry hole. YPF drilled one dry wildcat at Salta in 1945 and at year's end had two drilling.

The oil fields of Salta are in the geological province of Sierras Subandinas. The production is found in closely folded anticlines which trend in a general northerly-southerly direction and which plunge to the south. In the fields now developed the producing areas occur where the south plunge is interrupted and gives way to structural closure.

The outcropping formations are largely shales and poorly consolidated sandstones of Cretaceous and Tertiary age. The oil is produced from various formations ranging from Devonian to Tertiary, but that found in the higher formations is believed to have migrated up from a lower source. Most of the oil is produced from sandstones lying either next above or next below a calcareous zone of supposed Jurassic-Cretaceous age, but the underlying Devonian is commonly thought to be the most probable ultimate source.

Wells and Crude Production, Salta Area, Argentina

FIELD	Year of Discovery	OIL WELLS AT END OF 1945			CRUDE OIL PRODUCTION (Barrels)			
		Producing						
		Flowing	Art. Lift	Total Producing	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
Salta:								
Aguas Blancas	1924	..	5	5	86	30,649	31,299	1,216,842
Tartagal	1927	..	4	4	31	15,600	11,475	68,649
Ramos	1937	..	3	3	26	9,640	9,347	48,966
Rio Pescado*	1933	..	..	..	..	..	..	..
San Pedro	1928	5	20	25	1,298	511,050	473,909	13,415,168
Lomites	1927	..	33	33	255	115,142	92,927	3,188,351
Tranquitas*	....	..	..	..	....	.....	.....	.....

* Not Reported.

LODGING

Hotels

Buenos Aires—Plaza, Continental, Lancaster and City.

* * *

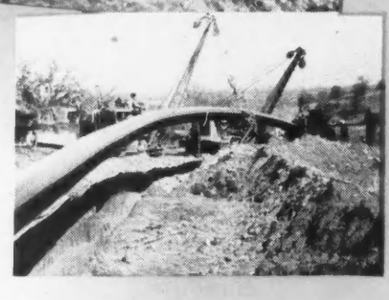
The cooperation of Lt. Col. Alfredo Intzaurgarat, President of Yacimientos Petroliferos Fiscales, and numerous members of his staff, is gratefully acknowledged.

Data on Argentine Refineries

Company, Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Cia. Nativa de Petroleos, Av. Roque Saenz Pena 567, Buenos Aires	Campana	16,000	8,000	S-C-S-L	Operating
Cia. Nativa de Petroleos, Av. Roque Saenz Pena 567, Buenos Aires	Bahia Blanca	3,000	1,850	Skim-Crk	Operating
Cia. Pet. Andina	Mendoza	1,200	.....	.....	.....
Diadema Argentina S. A. de Petroleo (Shell) Ave. Roque Saenz Pena 788, Buenos Aires	Buenos Aires	20,000	9,000	Skim-Crk	Operating
Cia. El Condor, Levalle 27, Avallaneda	Avallaneda, Buenos Aires	1,300	None	Skim-Lube	Operating
Lottero	Avallaneda, Buenos Aires	250	.....	.....	.....
Cia. "La Isaura", S. A. Av. Roque Saenz Pena, 699, Buenos Aires	Bahia-Blanca	2,000	None	Skimming	Operating
Standard Oil Co. S. A., Av. Roque Saenz Pena 567, Buenos Aires	Salta (Manuel Eloridi)	1,000	None	Skimming	Operating
Cia. Ultramar, S. A. Petroleo Argentina, Calle Chile 778, Buenos Aires	Buenos Aires	4,000	2,600	Complete	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	La Plata	31,500	23,000	Complete	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	San Lorenzo	9,500	7,550	Skim-Crk	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	Mendoza (Lujan)	3,000	1,000	Skim-Crk	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	Campana	2,200	.....	.....	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	Salta	1,900	.....	Top-Crk	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	Godoy Cruz	650	None	Skimming	Operating
Ramon Goreleri and Cia., Buenos Aires	Quilmes, Buenos Aires	150	None	Skim-Lube	Operating
Cia. General Asfaltos, Buenos Aires	Wilde, F. C. S., Buenos Aires	200	None	Skim-Lube	Operating
Compania Argentina de Petroleo, S. A. "Astra", Av. Leandro N-Alem 621 Buenos Aires	Comodoro Rivadavia	2,500	None	Skimming	Operating
Compania Ferrocarrilera de Pet. Peso Colon 185, Buenos Aires	Comodoro Rivadavia	5,700	2,000	Skim-Crk	Operating
Standard Oil Co. S. A., Argentina Av. Roque Saenz Pena 567, Buenos Aires	Plaza Huincul	315	None	Skimming	Operating
Yacimientos Petroliferos Fiscales R.S. Pens 777, Buenos Aires	Plaza Huincul	1,500	None	Skimming	Operating
Yacimientos Petroliferos Fiscales R.S. Pena 777, Buenos Aires	Vespucio	500	None	Skimming	Operating

Pipeline KNOW-HOW

In pipeline construction, the wealth of skill that builds up with long years of expert performance on the job is an asset of positive value to you! It's the ability to get the job done and get it done quickly and thoroughly that has made Midwestern Constructors leaders in the pipeline field. Over all types of terrain, under all kinds of field conditions, the practical reliability of Midwestern's organization means money saved and time gained in your production schedule! Ask us about your pipeline problems, you'll get sound advice . . . be under no obligation. Write today!



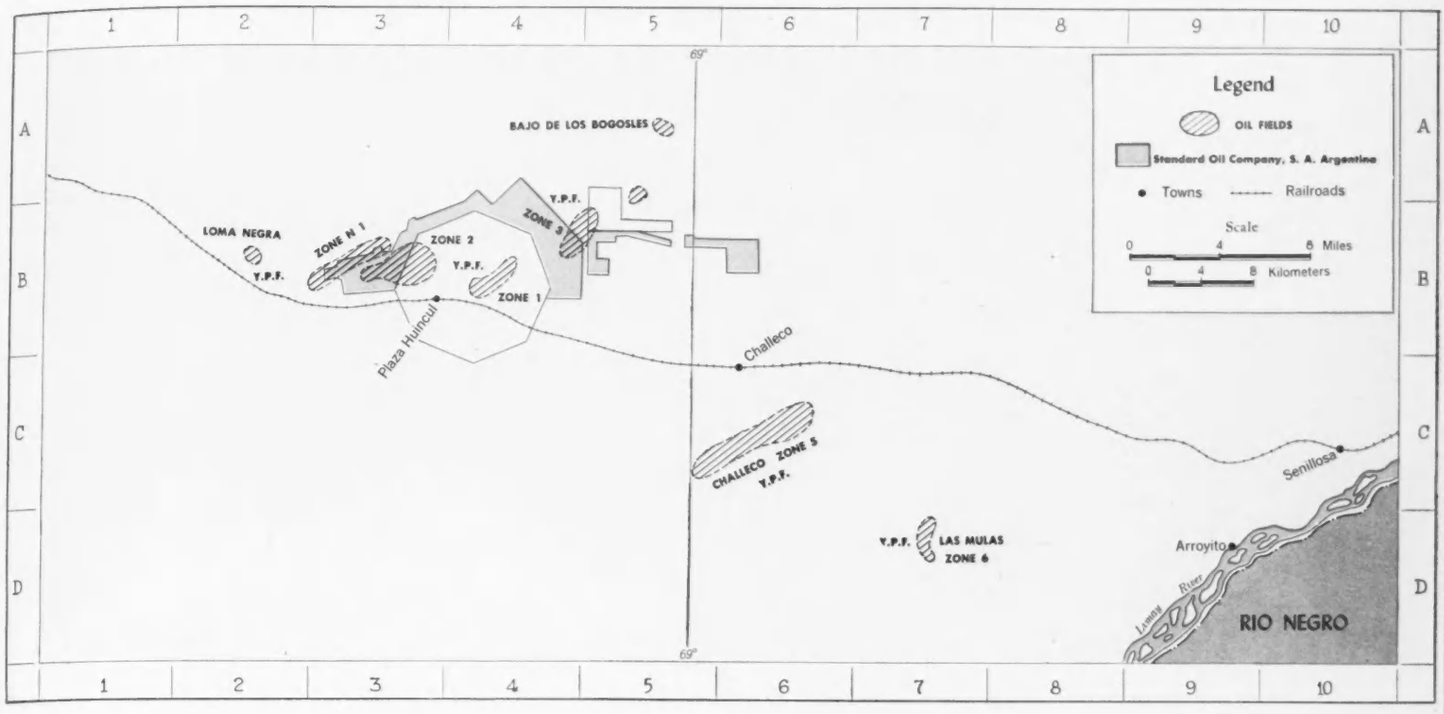
MIDWESTERN CONSTRUCTORS

MC BETTER BUILDERS

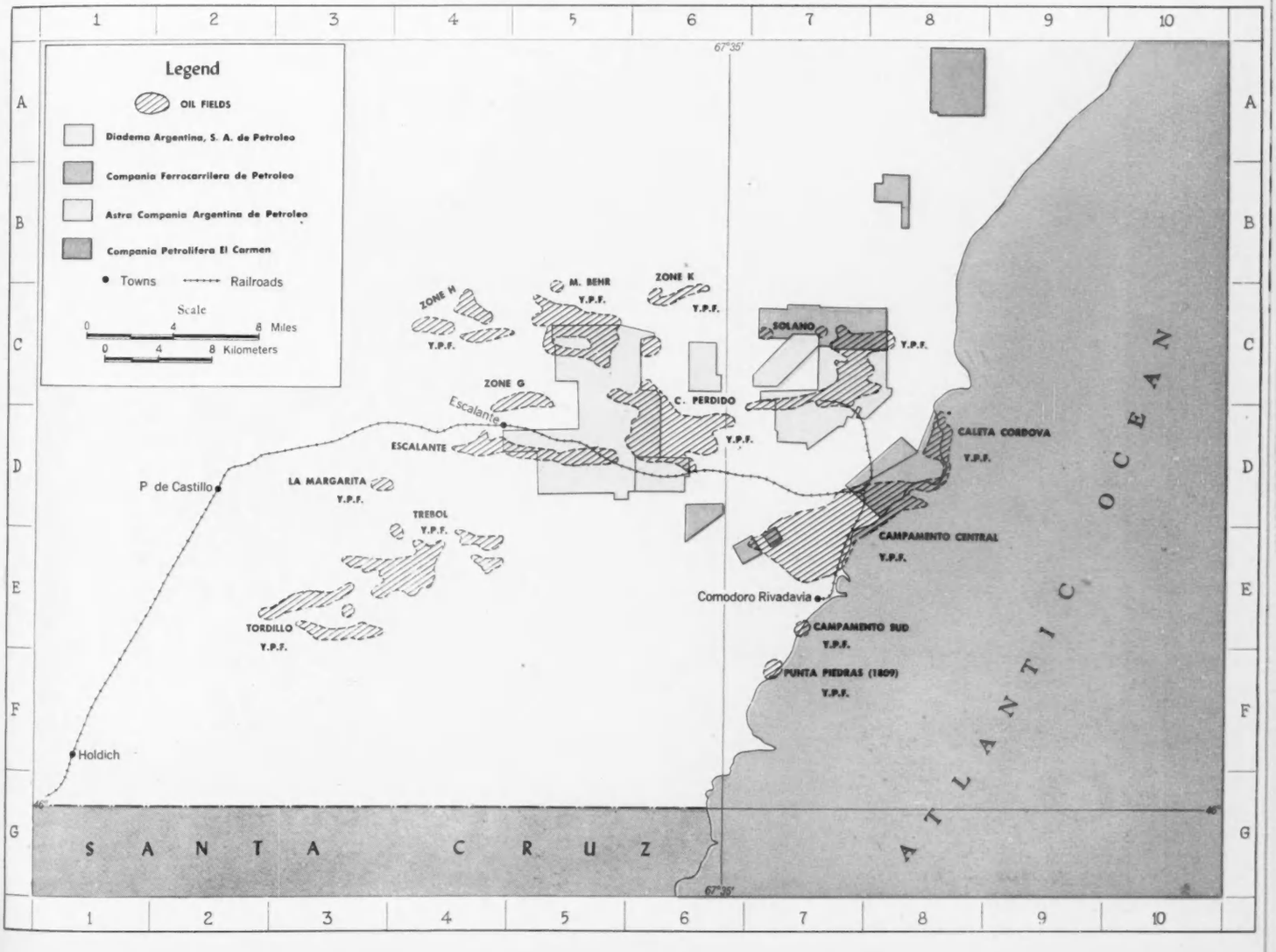
105 NORTH BOULDER • TULSA 3 • OKLAHOMA

F. E. STANLEY - MANAGER • TELEPHONE 3-4113 • C. C. BLEDSOE, ASST. MANAGER

ARGENTINA—Plaza Huincul Area



Comodoro Rivadavia Area



WHAT PRICE A MAP ?

. . . of the Antilles or Arabia

—"The Antilles," by Morten, 1690

—"Arabia," by Jansson, 1660

JANSSON AND MORTEN who drew these maps realized very little for them, and they could hardly dream that millions would be spent later on to map the subsurface of the same areas . . . destined to be among the largest oil producing lands in the world.

In South America, in Arabia, nearly all over the globe, the cost of GSI seismograph surveys has been mighty low per barrel of oil discovered. That's something to take into account when you call in GSI to ask, "What price a map of my prospect?"

GEOPHYSICAL SERVICE INC.

DALLAS, TEXAS

NORTH · SOUTH · EAST · WEST

Guiberson
OIL TOOLS
are on the job wherever oil is produced

BETTER BE SAFE THAN SORRY — GUIBERSON

(Reg. U. S. Pat. Off.

You'll find Guiberson's oil tools on the job in the oil fields of the world . . . from Alberta to the Argentine...from Bakersfield to Borneo. For more than 26 years, Guiberson's strict standards for quality and reliability have earned the confidence and acclaim of oil-men everywhere. Each new tool and each improved design is first perfected in the field, then manufactured with meticulous care to assure dependable performance under toughest working conditions. Guiberson's engineers and production experts control each step of the manufacturing process. When you see the name *Guiberson* on an oil tool, it is your guarantee of long, dependable, efficient service.

Manufacturers of safer, more efficient drilling and production equipment.

- Tubing Swabs
- Casing Swabs
- Tubing Swab Sinker Bars
- Plain and Swivel Rope Sockets
- Wire Line Oil Savers
- Tubing Catchers
- Tubing Catcher Anchors
- Tubing Anchors
- Tubing Spiders
- Control Head Packers
- Production Packers
- Spiral Packers
- Packer Cups
- Sucker Rod Strippers
- Tubing Strippers
- Combination Tubing Stripper and Spider
- Drill Pipe and Tubing Oil Savers
- Rotating Drilling Heads and Strippers
- Combination Drilling Head and Rotary Table
- Seal-o-Matic Unions
- Automatic Flow Valves

Manufacturers of oil field equipment, steel cabinets, domestic oil heaters, sheet metal products, and molded rubber products.

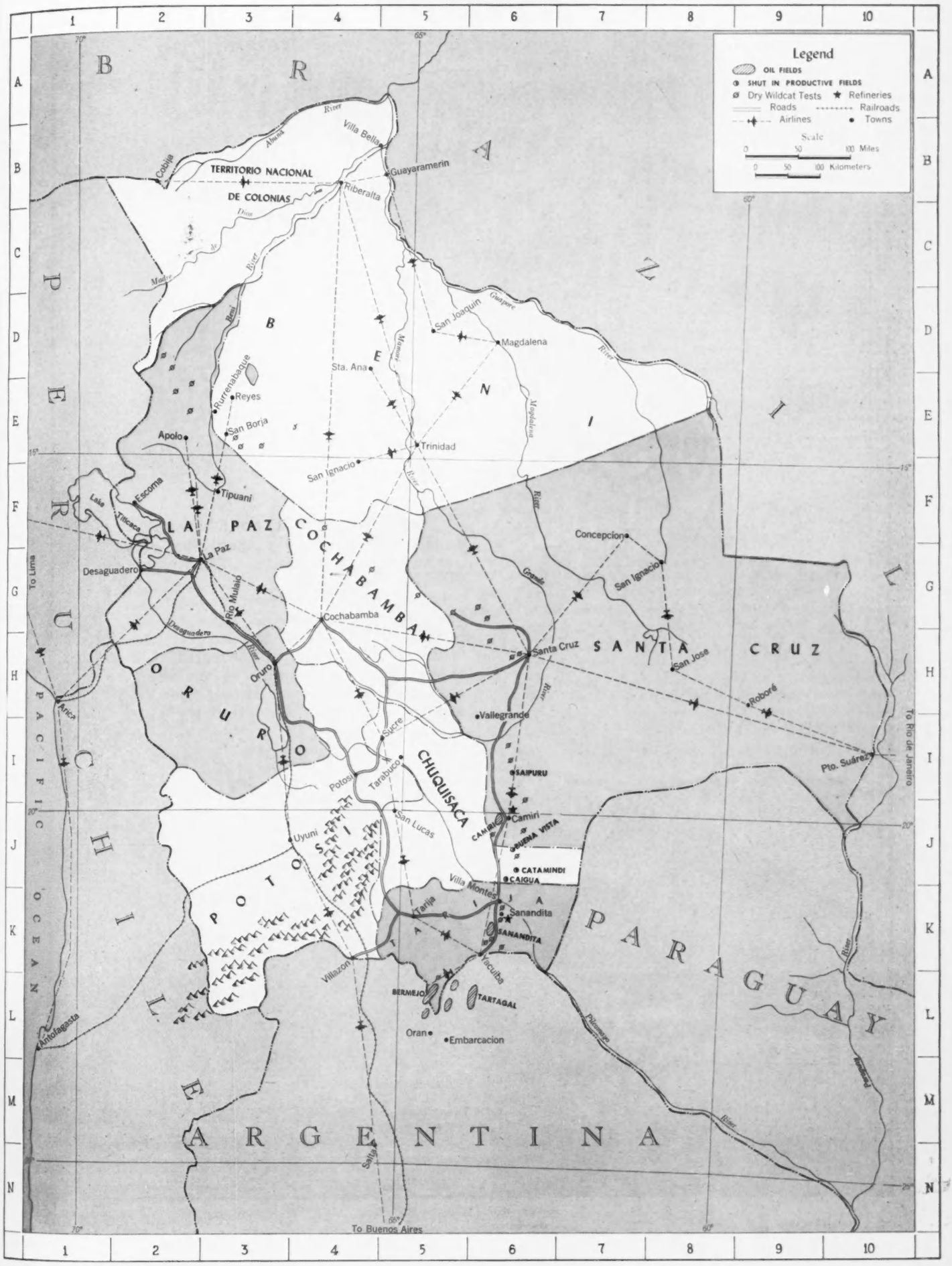
Guiberson U. S. A.

DALLAS, TEXAS **THE GUIBERSON CORPORATION** ESTABLISHED 1919

California Distributor: THE W. R. GUIBERSON CO., 717 East Gage Avenue, Los Angeles, California

Export Representative: I. FRANK BROWN, 30 Rockefeller Plaza, New York, New York

BOLIVIA


Legend
OIL FIELDS
SHUT IN PRODUCTIVE FIELDS
Dry Wildcat Tests
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
BRAZIL
PERU
CHILE
PARAGUAY
ARGENTINA
PACIFIC OCEAN
TERRITORIO NACIONAL DE COLONIAS
Cobija
Abuna River
Villa Bella
Guayaramerin
Riberalta
Madre de Dios River
Beni River
Rurrenabaque
Reyes
San Borja
Apolo
Sta. Ana
San Joaquin
Guapore River
Magdalena
Mamore River
Trinidad
San Ignacio
Tipuani
Escoma
Lake Titicaca
LA PAZ
La Paz
Desaguadero
To Lima
Desaguadero River
Rio Mulaio
COCHABAMBA
Cochabamba
Concepcion
Itenez River
Grande River
San Ignacio
Santa Cruz
SANTA CRUZ
San Jose
Roboré
To Rio de Janeiro
Pto. Suárez
ORURO
Oruro
Arica
Vallegrande
Sucre
Potosi
Tarabuco
CHUQUISACA
SAIPURU
Camiri
CAMIRI
BUENA VISTA
CATAMINDI
CAIGUA
Villa Montes
Sanandita
SANANDITA
Uyuni
San Lucas
POTOSI
Tarija
Villazon
Yacuiba
BERMEJO
TARTAGAL
Oran
Embarcacion
Pilcomayo River
Bermejo River
Antofagasta
Salta
To Buenos Aires

Wherever Men Drill for Oil you'll find "Youngstown"

QUALITY YOUNGSTOWN SERVICE

WHEREVER men go to seek the earth's "black gold"...there they can get and rely on Youngstown Oil Country Tubular Goods.

For more than 43 years, Youngstown has been supplying drill pipe, casing, tubing and line pipe to the petroleum industry in all parts of the world. Oil men in every producing area can recognize in the orange band on this pipe, the mark of quality and dependability.

YOUNGSTOWN OIL COUNTRY TUBULAR GOODS

Casing . . . . 4½" to 20" O.D.
Tubing . . . . 2⅜" to 4½" O.D.
Drill Pipe . . 2⅜" to 6⅝" O.D.
Line Pipe . . 3½" to 20" O.D.
All Standard Wall Thickness

Youngstown Oil Country Tubular Goods is identified by the orange band or bands.

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Pipe and Tubular Products-Sheets-Plates-Conduit-Bars-Coke Tin Plate-Electrolytic Tin Plate-Rods-Wire-Nails-Tie Plates and Spikes

BOLIVIA

HISTORY OF INDUSTRY

THE OIL industry in Bolivia has been operated as a state monopoly since 1937 through the Yacimientos Petrolifera Fiscales Bolivina (Government Oil Fields of Bolivia), a name copied from the Argentine government's oil company.

The earliest exploration and development, in Southern Bolivia, had been conducted by Standard Oil Company (New Jersey), but these properties were expropriated by the government and the company paid $1,750,000. The government thereafter took over all operations, exploration, production, refining and marketing.

The oil fields in Bolivia are in the extreme southern part adjacent to the Argentine fields of the Salta district. In fact, Bolivia's largest field, Bermejo, is a part of the same producing structure which, on the Argentine side of the border is called the Agua Blanca field and is operated by Standard Oil.

The Bolivian government has "working agreements" with the governments of adjoining countries for joint exploration and development operations wholly in Bolivia.

Bolivia's favorable oil belt in the south is involved in the Bolivian-Argentine convention," an agreement whereby Argentina shall furnish funds for further oil exploration, and shall construct a railroad connecting Salta and Santa Cruz. Bolivia is completely land-locked.

The central segment is covered by a Bolivian-Brazlian "convention" which provides that Brazil will extend the railroad from Corumba, on its western frontier, to Santa Cruz, to connect with the line to be built north from Argentina. Brazil reportedly is furnishing $2.5 million for oil explorations, Bolivia to carry on with a like amount. In this central segment is located the Saipuru pool, idle since discovery, and which now probably will be developed.

The northwest segment remains open, with another partnership likely between the government and private companies.

Development of Bolivia's oil industry was curtailed during the war by scarcity of materials. However, as soon as materials become available, an aggressive drilling campaign is planned both field and wildcat. Areas where wildcat tests have been drilled and abandoned include Caupolican, in the state of La Paz; Chapare and Isiboro, in Beni; Espajas, Guariri, and Tartendo in Santa Cruz; Macharetti, in Chuquisaca; and San Telmo, in Tarija, and others.

Producing Oil Wells and Crude Oil Production of Bolivia

FIELD, PROVINCE	Year of Discovery	OIL WELLS AT END OF 1944				CRUDE OIL PRODUCTION (Barrels)		
		Shut in	Producing			Daily at End of of 1944	Year 1945	Cumulative Through 1945
			Flowing	Art. Lift	Total Producing			
Bermejo, Tarija	1927	2	4	1	5	392	174,485	537,926
Camiri, Santa Cruz	1927	1	3	2	5	307	129,448	1,280,780
Sanandita, Tarija	1926	2	3	9	12	286	102,181	1,332,479

Annual Crude Oil Production of Bolivia
(In Barrels)

YEAR	Camiri	Sanandita	Bermejo	Camatindi	Total
1925	.....	.....	2,667	.....	2,667
1926	.....	7,611	10,083	.....	17,694
1927	15,171	8,485	16,404	.....	40,060
1928	5,397	.....	11,089	.....	16,486
1929	5,925	16,920	27,587	4,548	54,980
1930	27,604	5,604	16,455	7,327	56,990
1931	4,887	8,693	.....	.....	13,580
1932	6,347	54,459	.....	.....	60,806
1933	51,446	60,604	.....	.....	112,050
1934	76,304	81,676	.....	.....	157,980
1935	90,545	72,863	.....	.....	163,408
1936	46,905	58,113	.....	.....	105,018
1937	89,223	47,188	.....	.....	127,411
1938	90,431	45,420	.....	.....	135,851
1939	108,993	104,068	.....	.....	213,061
1940	111,742	177,026	.....	.....	288,768
1941	104,905	129,800	.....	.....	234,705
1942	120,737	139,418	47,552	.....	307,707
1943	109,716	109,748	114,308	.....	333,772
1944	94,054	102,602	117,296	.....	313,952
Cumulative to end 1944	1,151,332	1,230,298	363,441	11,875	2,756,946
1945 (Estimate)	129,448	102,181	174,485	.....	406,114
Cumulative to end 1945 (Estimate)	1,280,780	1,332,479	537,926	11,875	3,763,060

REFINING DATA

Bolivia has only two small topping plants located in the oil fields on the south plains, far from the nation's populated areas. These plants, both operated by YPFB, are located at Sanandita (capacity of 400 barrels daily) and Camiri (capacity, 800 barrels). Neither has been operating at capacity.

YPFB has plans for a 100-octane gasoline plant at Cochabamba and two package refinery units each of 1000-barrel capacity at Tintin. Serving the latter plants would be a 255-mile, 6-inch oil line from Camiri fields, for which line YPFB recently awarded a contract. Storage, rail loading terminals at Tintin and several auxiliary highways also are projected at a cost of $12 million.

All light products from Sanandita are sold locally, with most of the fuel oil exported to Argentina. Products from the Camiri plant are packed and distributed in trucks to Sucre and Santa Cruz.

* * *

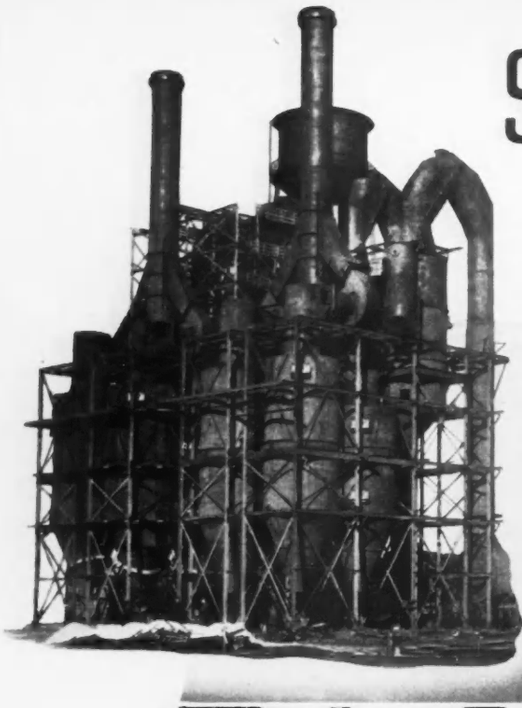
The cooperation of Jorge T. Lavadenz, President of Yacimientos Petroliferos Fiscales Bolivianos, is gratefully acknowledged.

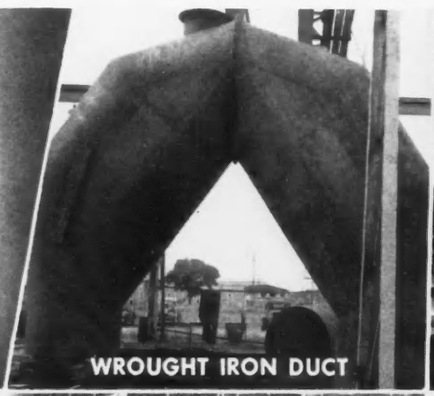
Engineering and Geological Data on Bolivia Oil Fields

FIELD AND PROVINCE	Location on Map Page 115	Proved Area (Acres)	Probable Ultimate Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION						
					Name	Kind	Age	Depth of Wells (Ft.) Minimum to Top of Pay	Depth of Wells (Ft.) Maximum Total Depth of Wells	Avg. Thickness of Pay (Ft.)	Type Structure
Bermejo, Tarija	L-5	600	1250	25.7	.....	.....	Permo-Triassic	2214	3600	....	Elongated dome
Buena Vista, Chuquisaca	J-6	1475	.....	43.5	.....	.....	Cretaceous	....	3165	....	Elongated dome
Caigua, Chuquisaca	J-6	.....	.....	.....	.....	.....	.....	.....	....	....	Tightly folded, overthrust anticline
Camatindi, Chuquisaca	J-6	1120	3200	41.5	.....	Sands	Cretaceous	2350	4800	....	Anticlinal fold, doming
Camiri, Santa Cruz	J-6	640	5000	53.1	.....	Sands	Devonian	....	3200	....	Elongated dome
Sanandita, Tarija	K-6	200	2000	41.5	.....	Sands	Triassic	2000	2100	....	Anticline
Saipuru, Santa Cruz	I-6	740	.....	40.0	.....	.....	Devonian	500	....	....	Structural dome

STEEL FABRICATION

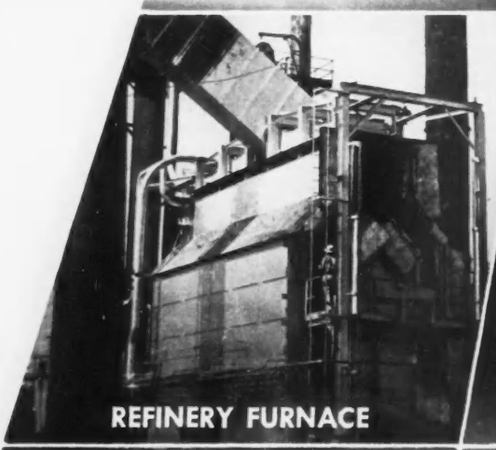
by Watkins



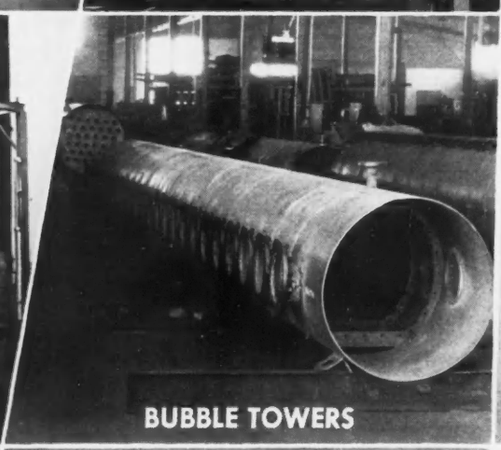


WROUGHT IRON DUCT

STEEL BUBBLE DECKS



REFINERY FURNACE

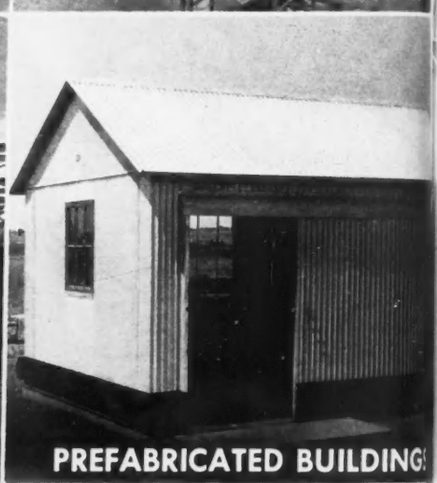


BUBBLE TOWERS

WALKWAYS AND PLATFORMS

FABRICATED PLATE WORK

STRUCTURAL STEEL FRAMING



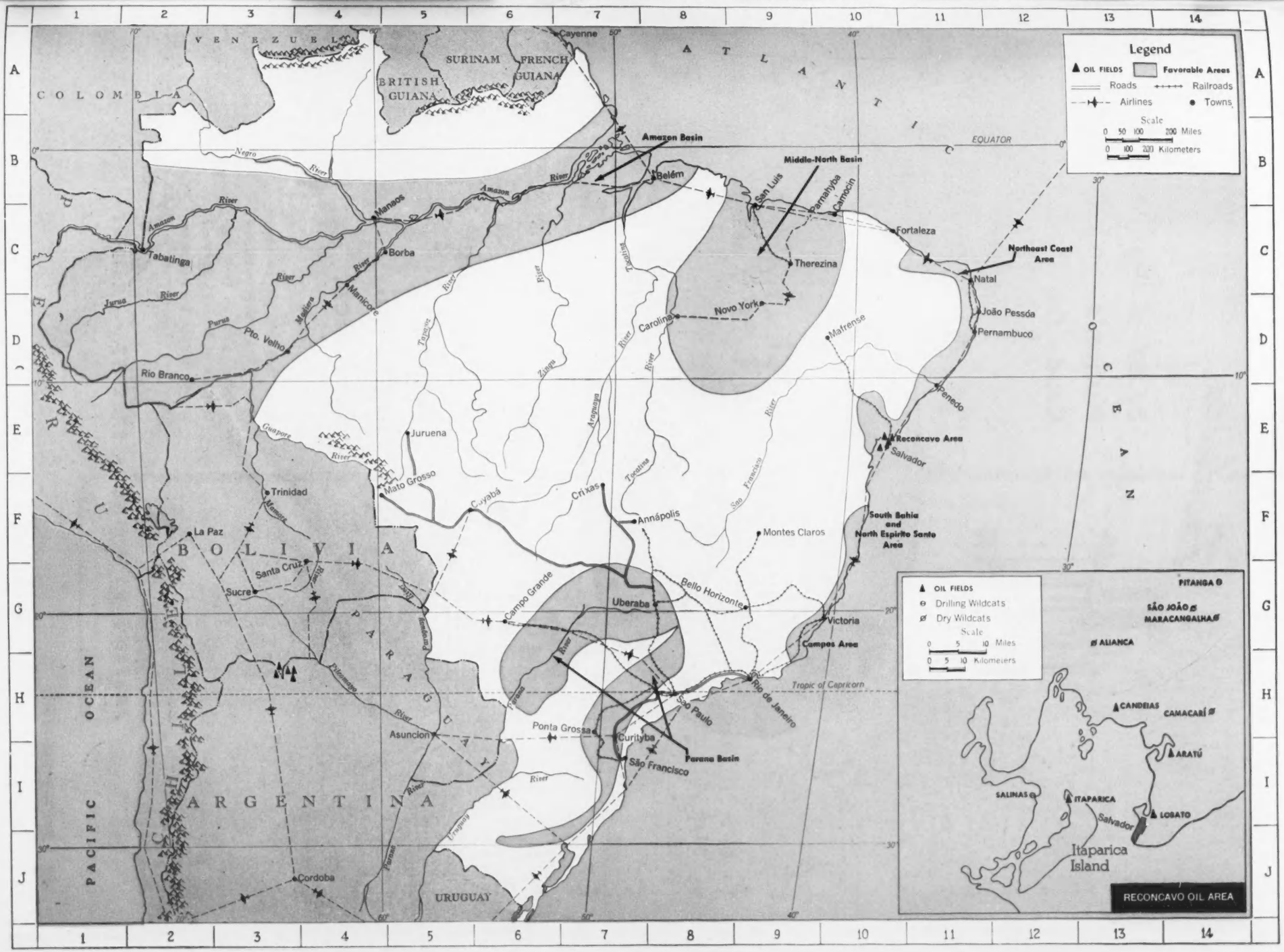
PREFABRICATED BUILDINGS

Watkins Inc. has the men, facilities and the "know how" to handle unusual fabrication jobs quickly and capably. Whatever your requirements, an unusual wrought iron duct, or the usual prefabricated industrial building, you'll find Watkins Inc. at your service. Whether your project is large or small, for the present or future, a letter, wire or telephone call will receive prompt attention.

WATKINS *Inc.*

WICHITA · KANSAS

STEEL · FABRICATION · HEAVY HARDWARE

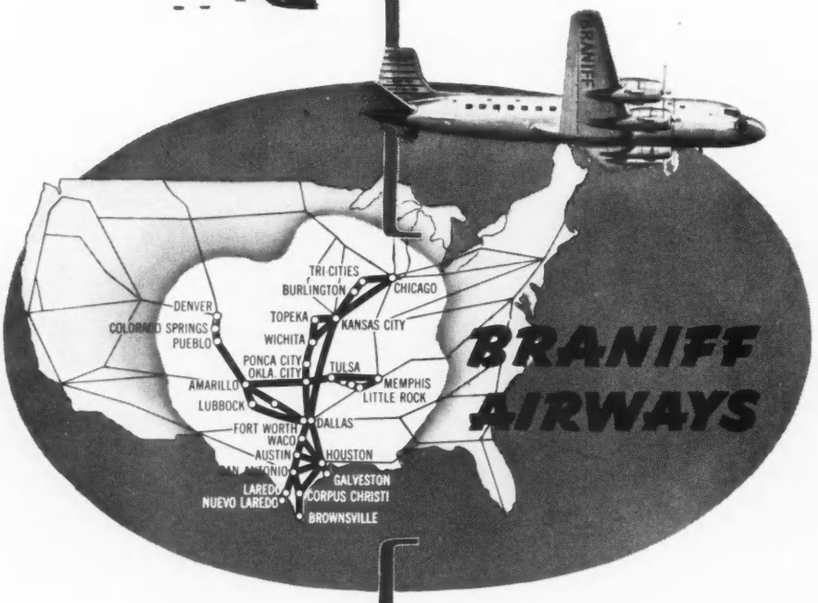

Legend
OIL FIELDS
Favorable Areas
Roads
Railroads
Airlines
Towns
Scale
0 50 100 200 Miles
0 100 200 Kilometers
Amazon Basin
Middle-North Basin
Northeast Coast Area
Reconcavo Area
South Bahia and North Espirito Santo Area
Campos Area
Parana Basin
Tropic of Capricorn
EQUATOR
VENEZUELA
COLOMBIA
SURINAM
FRENCH GUIANA
BRITISH GUIANA
ATLANTIC OCEAN
PACIFIC OCEAN
BOLIVIA
PARAGUAY
ARGENTINA
URUGUAY
CHILE
Cayenne
Belém
Manaos
Borba
Tabatinga
Pto. Velho
Rio Branco
Manicore
Juruena
Mato Grosso
Trinidad
La Paz
Santa Cruz
Sucre
Cuyabá
Campo Grande
Asuncion
Cordoba
Ponta Grossa
Curityba
São Francisco
São Paulo
Rio de Janeiro
Uberaba
Annápolis
Crixas
Montes Claros
Bello Horizonte
Victoria
Therezina
Fortaleza
San Luis
Parnahyba
Camocin
Natal
João Pessóa
Pernambuco
Carolina
Novo York
Malfrense
Penedo
Salvador
Negro River
Amazon River
Juruena River
Guapore River
Mamore River
Madeira River
Purus River
Javary River
Tocantins River
Araguaya River
Zingu River
Tapajos River
Tibagy River
Parnahyba River
Sao Francisco River
Paraguay River
Parana River
Pilcomayo River
Bermejo River
Salado River
Uruguay River
Negro River
OIL FIELDS
Drilling Wildcats
Dry Wildcats
Scale
0 5 10 Miles
0 5 10 Kilometers
PITANGA
SÃO JOÃO
MARACANGALHA
ALIANCA
CANDEIAS
CAMACARÍ
ARATÚ
SALINAS
ITAPARICA
LOBATO
Salvador
Itaparica Island
RECONCAVO OIL AREA

BRAZIL

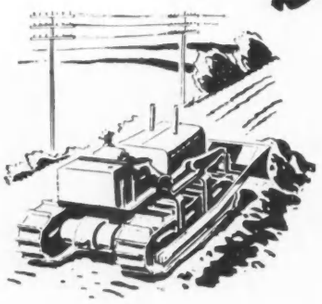
THE VAST AREA SERVED BY BRANIFF

Produces

65.6% of the Nation's Crude Oil



Buys



29.7% of the Nation's Industrial Equipment

More than 750,000 persons, during 1946, will gain added profit or pleasure from regular use of Braniff's daily air service through this rich area.

Air PASSENGERS • *Air* MAIL • *Air* EXPRESS • *Air* FREIGHT

BRAZIL

DRILLING ACTIVITY

INCREASED wildcat drilling in Brazil is on the 1946 program while activity in proven fields likely will remain on the same level as in 1945 when 14 wells were drilled.

At the end of 1945, two important wildcat tests were drilling, both in the Bahia region on the Atlantic seaboard. The government-owned test at Pitanga, about 30 miles north of Bahia (Sao Salvador), is reported to have set pipe around 7500 feet to test a good show recorded on an electrical log. In the Salinas area, 20 miles west of Bahia, the government has a test drilling below 1000 feet. Other tests are slated to be drilled during 1946 as a result of the 1945 exploration campaign.

There were two dry wildcat tests completed in 1945, both located in the Bahia region. The test in the Maracangalha sector was abandoned at 3988 feet while at Camacari a test was a failure at 5035 feet. Both of these wildcat ventures were started in October, 1944, and completed in February, 1945. The two tests drilled in 1945 compares with only one test drilled in 1944. The test at Mata de Sao Joao was abandoned on June 6, 1944, at a total depth of 8197 feet. The basement was not reached in this wildcat test and some shows of oil were reported at 6160-6180 feet and 6690-6730 feet. However, efforts to make a commercial producer of the well failed.

Field development in 1946 is centered in two pools as it was in 1945. A maximum of eight wells are slated to be drilled during the year in the Candeias field while in the Itaparica field, a maximum of four wells will be drilled.

GEOLOGICAL PROVINCES

There are five major geological provinces in Brazil, including the already productive region of Bahia, where oil could be expected to be found.

The most important of these provinces is the coast belt embracing the Bahia and Alagoas areas. In the Bahia basin the sedimentary rocks are Tertiary but the underlying beds are considered to be Cretaceous. The basin is locked in by shield rocks except a narrow gap which connects it with the present-day ocean. The oil shales that form outcrops along the coast of Alagoas are of Tertiary age and, judging by the fish fauna, Eocene.

The second major province having favorable geological conditions is the panhandle of southern most Brazil on the coast below Rio de Janeiro. This district embraces a large Permian basin, underlain by Carboniferous and Devonian sediments and extends over the greater portions of the states of Sao Paulo, Parana, Santa Catharina, and Rio Grande do Sul. Considerable wildcatting has been done in the basin, but tests were not on structures and therefore were inconclusive.

Another important province is the Middle North region, embracing most of the state of Maranhao and the western half of the state of Piaui. Although there has been no drilling in this province, thick sedimentation of Mesozoic and Paleozoic is suspected.

The fourth prospective oil province is the Lower Amazon Basin, centering around Santarem and Obidos in the state of Para. Sediments are of Carboniferous, Silurian, and Devonian age and Marine in character. Near Santarem two tests drilled to about 1500 feet encountered gas.

The fifth province is the Upper Amazon Basin in the territory of Acre. This sector ranks along with the northeastern coastal belt as having the best oil possibilities to be found in Brazil. It is a region of Mesozoic and Cenozoic marine formations. The region is already semiproven in that it is related to Cretaceous and Tertiary fields of Peru, extending within 50 miles of the Pachita field of Peru.

LODGINGS

Hotels

Rio de Janeiro: Copacabana-Palace, La Gloria, Serrador, Palace, Aeroporto, Central, and Rex.

Sao Paulo: Esplanade and Excelsior.

Bahia (Sao Salvador): Grand.

* * *

The cooperation of Major Milton de Lima Araujo, Chefe do Gabinete, Conselho Nacional do Petroleo, Rio de Janeiro, is gratefully acknowledged.

Brazil Production and Producing Wells

FIELD, PROVINCE	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)		
		Shut in	Producing			Daily at End of 1945	Year 1945	Cumulative Through 1945
			Flowing	Art. Lift	Total Producing			
Lobato, Bahia	1939	2	....	....	....	Shut in	6,728	55,363
Candeias, Bahia	1941	8	....	4	4[1]	56	36,663	80,740
Aratu, Bahia	1941	....	....	2	2	15	6,718	44,402
Itaparica, Bahia	1941	5	....	2	2	12	28,891	41,585
Total	.....	15	....	8	8	83	79,000	222,090

[1] Actually there are 12 wells capable of producing oil.

Note: Production for any one month means nothing. The only outlet for these producing areas are two small 150-barrel skimming plants. The wells are not operated above the level of the local requirements for products. The total actual capacity of the wells is between 1000 and 1500 barrels per day.

Brazil Field Completion and Drilling

FIELDS, PROVINCE	WELLS COMPLETED IN 1944					WELLS COMPLETED IN 1945					Wells Drilling Dec. 31, '45
	Oil	Gas	Dry	Total Wells	Total Footage	Oil	Gas	Dry	Total Wells	Total Footage	
Labato, Bahia	..	..	..	....	....	..	..	..	....	....	....
Candeias, Bahia	4	..	2	6	21,061	4	..	1	5	14,831	2
Aratu, Bahia	..	1	1	2	5,448	..	..	..	....	....	....
Itaparica, Bahia	..	3	2	5	13,004	5	1	1	7	14,985	1
Total	4	4	5	13	39,513	9	1	2	12	29,816	3

Refineries of Brazil

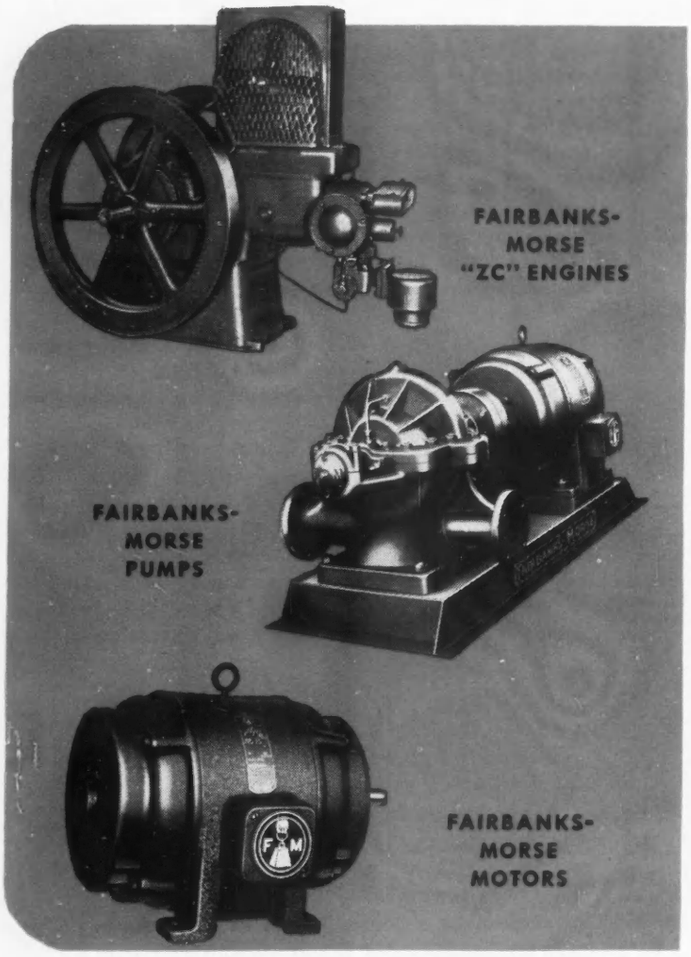
Company Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Industrias Matarazzo de Energia S.A. "IME" Predio Conde Matarazzo Sao Paulo	Sao Caetano	2500[1]	None	Skimming	Operating
Ipiranga, S.A. Companhia Brasilerra de Petroleos, Saco de Mangueira, sem numero, Box 56, Rio Grande	Rio Grande	1800	None[2]	Skimming	Operating
Cai. Distilaria Riograndense de Petroleo	Uruguayana	250	None	Skimming	
Conselho Nacional do Petroleo	Aratu (Bahia)	150	None	Skimming	Operating
Conselho Nacional do Petroleo	Candeias (Bahia)	150	None	Skimming	Operating

[1] Actual throughput (since 1939) 350 bpd. Rated capacity possibly 800 bbls.

[2] Application has been granted to install cracking equipment which will increase total capacity to 3000 bbls.

Just What the ~~Doctor~~ Oil Field Man Ordered

Fairbanks-Morse offers a line of oil field equipment designed and built to do a dependable, economical job with an absolute minimum of attention and maintenance



"ZC" Engines

Developed from 50 years of oil field engine experience. Simple, dependable, gas or gasoline engines with the fewest possible moving parts. Almost any oil field man can service them on the spot.

These engines operate for years with no attention except the addition of a minimum of fuel and lubricating oil. Sizes from 3 to 30 hp.

Pumps

Fairbanks-Morse Pumps answer every oil field need . . . for pumping against low, moderate, medium, or high heads; for capacities up to 50,000 g.p.m.; for handling every type of liquid.

Remember: only Fairbanks-Morse offers a complete line of pumps with pump, driver (motor or engine), coupling, and base all designed, built, guaranteed, and serviced by one manufacturer.

Motors

There's a Fairbanks-Morse Motor especially made for every kind of job—to work under every kind of condition—met in any oil field.

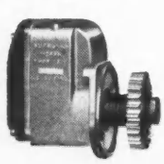
One example is this Fairbanks-Morse general-purpose motor with the exclusive Copper-spun Rotor—the only rotor centrifugally cast in one piece of copper. Rated 40°C., with excellent starting and accelerating torques, and high efficiency and power factor.

• • • •

Write for the complete catalog of Fairbanks-Morse Oil Field Equipment. Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

Fairbanks-Morse Magnetos

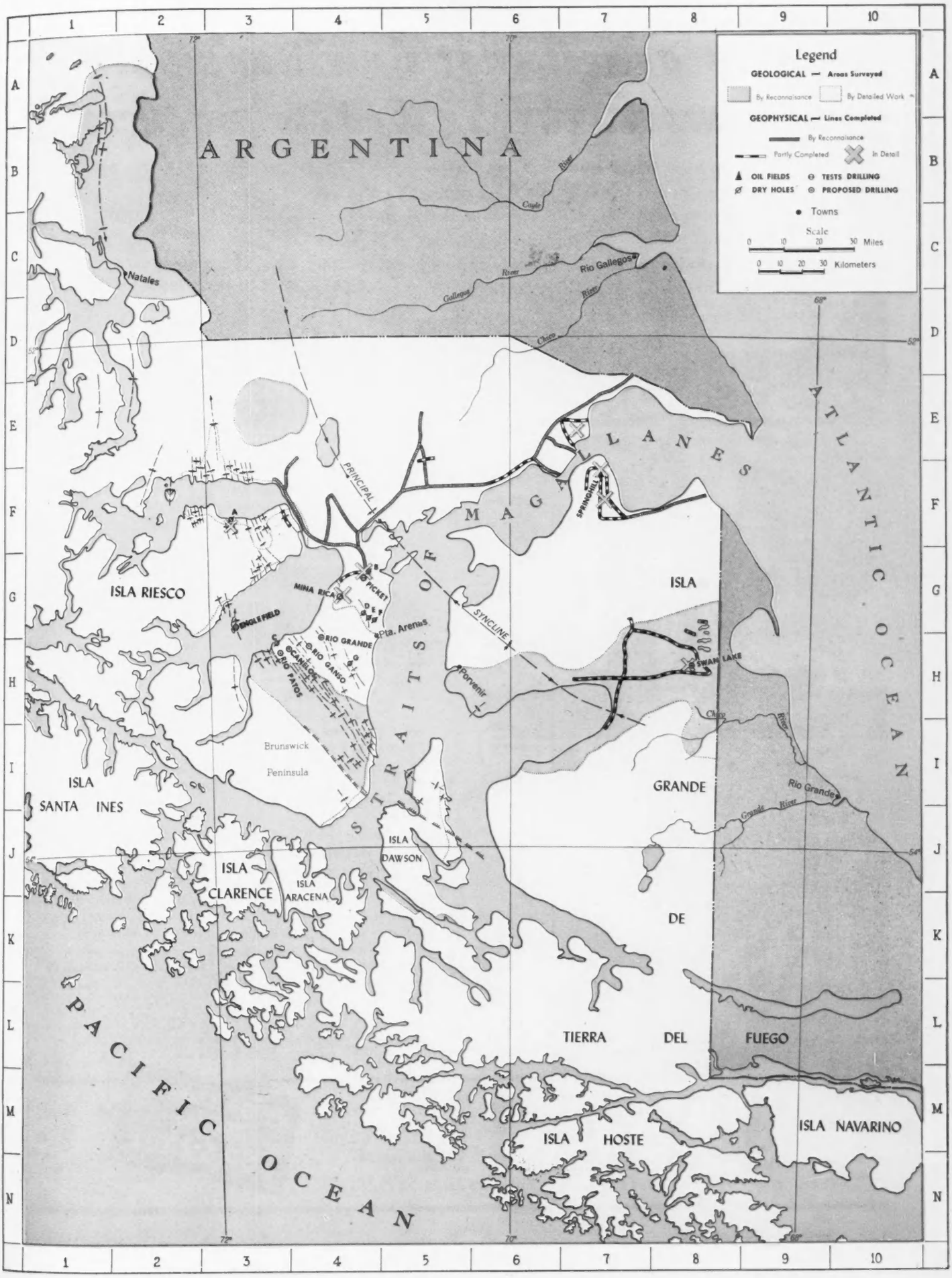
There's a Fairbanks-Morse Magneto for every engine. These magnetos, designed by men who know engines inside and out, step up engine performance, save gas and oil, and assure fast starting regardless of weather.



Fairbanks-Morse

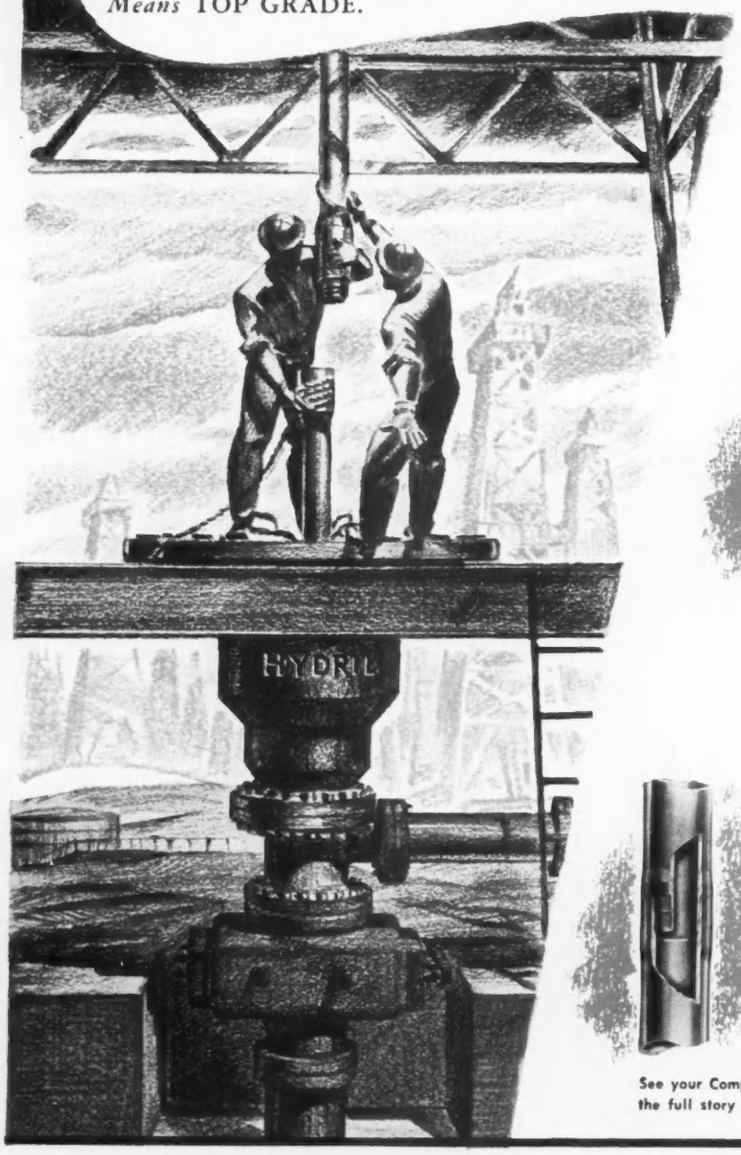
A name worth remembering

Oil Field Equipment • Diesel Locomotives
Diesel Engines • Generators • Motors • Pumps
Scales • Magnetos • Stokers • Railroad
Motor Cars and Standpipes • Farm Equipment


Legend
GEOLOGICAL — Areas Surveyed
By Reconnaisance
By Detailed Work
GEOPHYSICAL — Lines Completed
By Reconnaisance
Partly Completed
In Detail
OIL FIELDS
TESTS DRILLING
DRY HOLES
PROPOSED DRILLING
Towns
Scale
0 10 20 30 Miles
0 10 20 30 Kilometers
ARGENTINA
Natales
Rio Gallegos
Coyle River
Gallegos River
Chico River
PRINCIPAL
SPRINGHILL
STRAITS OF MAGALLANES
ATLANTIC OCEAN
ISLA RIESCO
MINA RICA
PICKET
EAGLE FIELD
Pta. Arenas
RIO GRANDE
RIO GANSO
CANELO CREEK
RIO PATOS
SYNCLINE
Porvenir
SWAN LAKE
ISLA
Chico River
Brunswick Peninsula
ISLA SANTA INES
ISLA DAWSON
ISLA CLARENCE
ISLA ARACENA
GRANDE
Rio Grande
Grande River
DE
TIERRA DEL FUEGO
PACIFIC OCEAN
ISLA HOSTE
ISLA NAVARINO

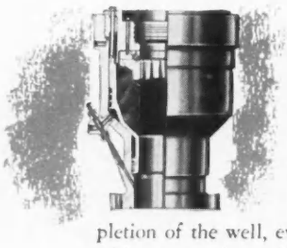
Here's a well that's well-equipped Of course...they're HYDRIL *products*

This well might be in Iran, Venezuela, Texas, Arabia, California, Borneo — anywhere in the world — because, for twenty years, operators the world over have used HYDRIL Products for their simplicity, strength, safety and downright efficiency. Properly designed, carefully engineered and manufactured — HYDRIL MADE *Means* TOP GRADE.



HYDRIL OS* "TWINPIN" DRILL PIPE CONNECTORS

HYDRIL "TWINPIN"—Combined wear subs and drill pipe connectors—give longer life to drill pipe, both by preventing pipe damage and by giving a flexibility in drill string handling impossible with ordinary joints. Every thread is a makeup thread; it's easy to reverse any stand to minimize slip cut, tong-wear and thread wear, or to reverse the entire string when moving to a new location. Easy to change, right on the rig with the regular rig tongs —drill pipe stays in service. Cost? Less than a conventional tool joint with wear sub, and when "TWINPINS" do wear down, they can be economically resheathed many times. A. P. I. or Hydril thread. ***OS Means Oversize**



HYDRIL BLOWOUT PREVENTERS

This one blowout preventer gives complete protection against blowouts right from the start of drilling to completion of the well, even when running casing—all without any change in cellar connections! A pull on control handle gives *instant* packoff around *any* drill string member—drill pipe, kelly, drill collar, casing or tubing. Safe, simple, secure, long-lived!

HYDRIL CASING JOINTS

The two-step thread with its sealing shoulder makes a high-strength joint that is absolutely leak-proof to pressures either internal or external. Inside, the casing is even diameter, hydraulically smooth, with no gaps at the joints to cause drag and turbulence, and to invite corrosion. Practically self-stabbing, easy to run, no couplings.

See your Composite Catalog—Pages 1349 to 1400 for the full story on these—and other—Hydril Products.

HYDRIL

HYDRIL COMPANY • 714 WEST OLYMPIC BLVD. • LOS ANGELES 15, CALIF.

HYDRIL MADE *Means* TOP GRADE

CHILE

FIRST PRODUCTION

FIRST commercial production of oil for Chile has been established on Isla Grande of Tierra Del Fuego, 6 miles from the north end of the Straits of Magellan in a wildcat test drilled by Corporation de Fomento de la Produccion (The Company for the Development of Production), government wholly-owned corporation.

The wildcat, drilled on a structure discovered by geophysical methods, is credited with an estimated flow of 200 barrels of oil daily through a quarter-inch choke from Tertiary beds at 7419-38 feet. The well is known as the Spring Hill 1 (F-7 on accompanying map, page 123) and is considered the "farthest south" oil discovery in the world. The second test, known as Spring Hill 2, about ½-mile north of the discovery well, is drilling below 3100 feet.

On the Brunswick Peninsula, west of the Spring Hill wells, the Chilean government's cable tool wildcat test on the Mina Rica structure (G-4) has been abandoned at about 1880 feet. Tools on this test were moved northward about 9 miles to drill the government's Picket 1. This test now is near contract depth of 2500 feet. George P. Livermore, Inc., of Lubbock, Texas, is the government's drilling contractor.

EARLY DEVELOPMENT

Numerous gas and some oil seepages have long been known in the Chile sector of the Santa Cruz basin which extends northward into Argentina. German geologists made extensive surveys there prior to World War I. Some tests were drilled by the Chilean Government in the late 20's and early 30's, all on the Brunswick peninsula and near Punta Arenas (G-4), with negative results.

Several of these early tests reported shows of gas and one wildcat had showings of oil in several horizons but was never completed as a commercial producer. This latter test, known as the Government's R-2, was drilled in 1931 and reached a depth of about 1170 meters (3838 feet). It had oil shows in sandstone between 1312-1968 feet and did produce about 30 barrels of paraffin oil, 0.885 specific gravity. The R-2 was located on the crest of an anticline and was bottomed in the Lower Cretaceous when drilling was halted. An offset was dry at total depth of 2132 feet. Two dry holes were drilled in 1936 and another in 1937.

In 1941, the Chilean government, working through the Department of Mines and Petroleum, drilled a 3000-foot dry hole north of the R-2 well on Brunswick Peninsula. However, in 1943 the oil industry of Chile was transferred to Compania de Fomento de la Produccion, the present operating company. Fomento has spent considerable money in exploration in the Punta Arenas sector and ten closed structures have been worked out to date.

Data on Oil Tests Drilled in Chile

WELL[1]	Location Map Page 123	Year Compl.	Depth (Feet)	Formation at Bottom	Remarks
A	F-3	1937	2135	Tertiary	Gas showings.
B	G-4	1941	3017	Tertiary	.....
C	H-3	1936	4990	Cretaceous	.....
D	G-4	1936	5773	Tertiary	.....
E	G-4	1931	3838	Tertiary	Several oil shows. Made some oil.
F	G-4	1931	2135	Tertiary	.....
G	H-4	1930	4560	Tertiary	.....
Spring Hill 1	F-7	....	....	.....	Opened oil field at 7438 feet in 1945. Drilling deeper.
Mina Rica 1	G-4]	....	....	.....	Drilling.
Spring Hill 2	F-7	....	....	.....	Offset to Spring Hill 1. Drilling.

[1] All wells drilled by Chilean government. Letters refer to designation of wells on map.

PRESENT ACTIVITY

Early in 1945, the government-owned company contracted with George P. Livermore, Inc., of Lubbock, Texas, to ship in a large rotary rig, capable of drilling to 11,000 feet, to start operations on its Spring Hill 1. The success of the first wildcat has created the incentive for further wildcat drilling in the Tierra Del Fuego area.

The exploratory work under the direction of Fomento was largely geological on the Brunswick peninsula, where outcrops can be mapped, but purely geophysical on the Isla Grande of Tierra Del Fuego, which is covered completely by glacial drift. The main Andean Range lies approximately along the south end of the western boundary between Argentina and Chile and the Baldwin Range trends eastward below Argentina's south boundary. Nearest production to Chile's new oil field is at Comodoro Rivadavia in the San Jorge Basin of Argentina.

Locations have been made on Little Spring Hill structure, a short distance south of the first discovery, and on the Seven Lakes (San Sebastian) structure, about 50 miles southeast and within ten miles of the Argentine border.

The Mina Rica anticline, as well as Canelos (H-3), Rio Grande (H-4), Englefield (G-3) and Rio Patos (H-3) (sites for proposed tests), a short distance southwest, are purely geological locations. On three others, also on Brunswick peninsula, Rio Ganso (H-4), Rio Patos (H-3) and Laguna Blanca (one the mainland), supplemental geophysical surveys have been made. Most of the geophysical work has been done on the mainland to the northwest, territory also lying within the Santa Cruz basin, but no favorable structures reported.

TRAVEL TO FIELD

The territory under exploration in Chile is somewhat difficult to reach. The "Aera Posta" line of the Argentina government has planes to Rio Gallegos, a two-day trip from Buenos Aires, and a bus line makes Punta Arenas the third day. On the Chilean side, Punta Arenas is a ten to 12 day trip by boat from Valparaiso, or a train can be taken to Puerto Montt, Chile, from where Punte Arenas is a five-day trip by boat. The Chilean government is about ready to open a new airline making semi-weekly flights from Puerto Montt to Punta Arenas which will shorten travel time materially.

REFINERIES

Three refineries totaling about 500 barrels daily, crude charging capacity, and all skimming plants, are listed for Chile (locations at Iquique, Del Mar and Talcahuano) but these were shut down several years ago. The grease plants are still operating but it is probable that they will not resume the refining of crude oil.

DISTRIBUTION

A domestic company, Campania de Petroleos de Chile (COPEC) has about one half the gasoline distribution, West India (Standard Oil Company, New Jersey) about one third, and Shell-Mex the remaining one sixth.

LODGING

Hotels:

Santiago: Crillon and Carrera.

* * *

The cooperation of Ing. Luciano Claude, Chief of Fuel Division, Compania de Fomento de la Produccion, is gratefully acknowledged.

FROM ORE MINE TO FINISHED UNIT . . .

Bethlehem all the way

Here's the picture in brief:

Bethlehem drilling and pumping equipment is made by an integrated, closely-knit organization that mines its own ore . . . makes its own steel . . . does its own rolling, forging, and casting . . . designs, machines, assembles, and services its own products.

Each step in the making of Bethlehem machinery is supervised by specialists who have devoted many years to the oil business. Behind them are the entire facilities of Bethlehem Steel Company. That's why every Bethlehem unit is soundly engineered, soundly manufactured; why it's durable, efficient, and long-lasting.

That's why, too, you can place complete reliance in a recommendation by Bethlehem—and in the widespread Bethlehem service organization, whose men are available at convenient points throughout the oil fields.

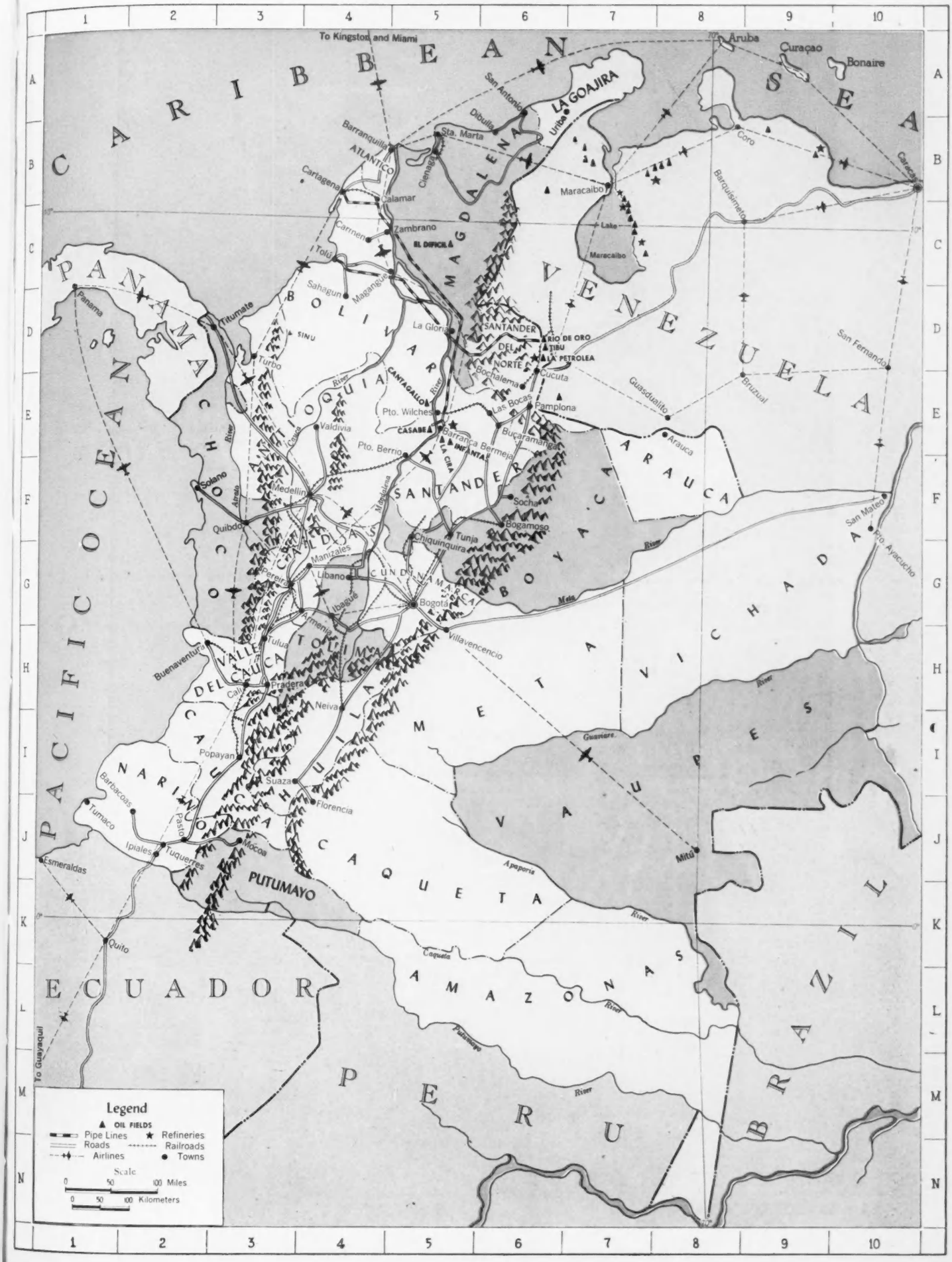
BETHLEHEM SUPPLY COMPANY

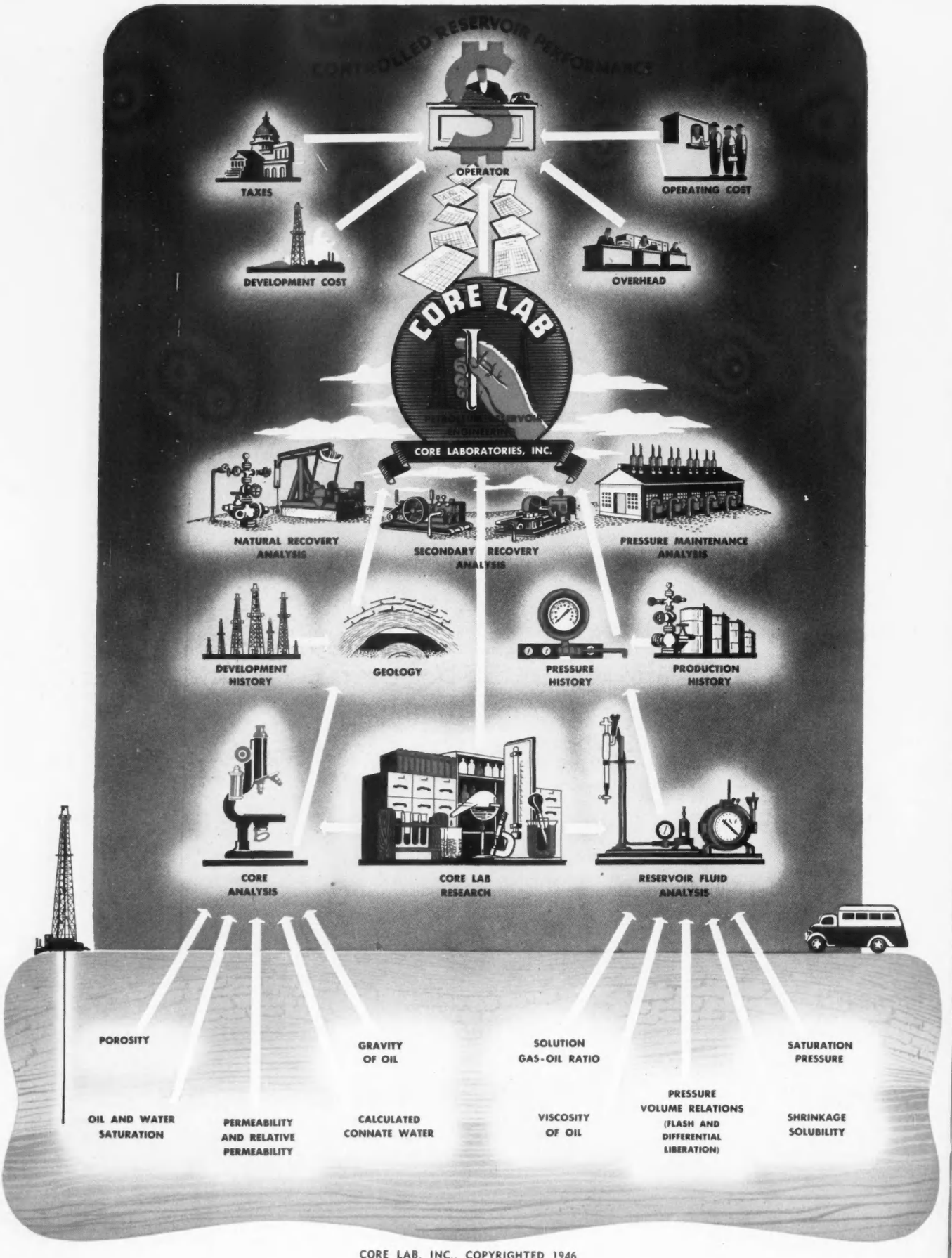
TULSA, OKLAHOMA

Subsidiary of Bethlehem Steel Corporation

BETHLEHEM STEEL

COLOMBIA


To Kingston and Miami
CARIBBEAN SEA
Aruba
Curaçao
Bonaire
LA GOAJIRA
San Antonio
Dibulla
Uribia
Barranquilla
ATLANTICO
Sta. Marta
Ciénaga
Cartagena
Calamar
MAGDALENA
Maracaibo
Coro
Carora
Barquisimeto
Lake Maracaibo
Zambrano
Carmen
Tolú
EL DIFICIL
Sahagun
Magangue
PANAMA
Panama
Titumate
BOLIVAR
SINU
Turbo
La Gloria
SANTANDER DEL NORTE
RIO DE ORO
TIBU
LA PETROLEA
Bochalema
Cucuta
VENEZUELA
San Fernando
Guasdualito
Bruzual
ANTIOQUIA
CANTAGALLO
Pto. Wilches
Las Bocas
Pamplona
CASABE
Barranca Bermeja
Bucaramanga
Pto. Berrio
INFANTA
Valdivia
Araure
Solano
Medellin
SANTANDER
ARAUCA
Quibdo
Socha
Bogamoso
San Mateo
Tunja
Chiquinquira
Manizales
Pereira
Libano
CUNDINAMARCA
Ibague
Bogotá
BOYACA
Pto. Ayacucho
Armenia
Villavencio
Tulua
VALLE DEL CAUCA
TOLIMA
Buenaventura
Cali
Palmira
Pradera
Neiva
META
VICHADA
Popayan
HUILA
CAUCA
NARIÑO
Barbacoas
Tumaco
Pasto
Suaza
Florencia
Ipiales
Tuquerres
Mocoa
Esmeraldas
PUTUMAYO
CAQUETA
Mitú
Quito
ECUADOR
AMAZONAS
BRAZIL
PERU
To Guayaquil
Legend
OIL FIELDS
Pipe Lines
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers



CORE LAB, INC., COPYRIGHTED 1946

CORE LABORATORIES, INC. . . . DALLAS, TEXAS

COLOMBIA

PRODUCTION

SINCE 1928, the seventh year after the first commercial production was opened in Colombia, the country has produced an average of 20 million barrels yearly, with the best year 1940's 25,500,000 barrels. During 1942 and 1943 production dropped one half, chiefly due to shortage of shipping, but service was restored to permit more than 22 million barrels for each of the following war years. Total accumulative production amounts now to 371,591,563 barrels, placing it eighth among the producing countries of the world. Performance of its producing areas indicate that there should be an increase in output due to new fields discovered recently, one of which—Casabe—went on production during the middle of 1945. The De Mares concession, operated by Tropical Oil Company and situated in the middle Magdalena Valley area, maintains an output of nearly 16 million barres annually, and this year opened a new area, the Galan field, which produces from the same formations flowing in the Casabe field across the river. Recent development of the Cretaceous formations in the Tibu field on the Barco concession point to expanded production from that area. In addition the Shell group's El Dificil field in the Lower Magdalena Valley had completed seven producing wells by the end of 1945, although it had not yet gone into the exploitation or shipping phase of the comcession. Less promising areas have been opened by the Socony-Vacuum interests at Cantagallo, north of Casabe, and by Socony and Tropical at Sinu in northwestern Colombia. First oil was found at Cantagallo in 1943, but to date only three producers have been completed.

Casabe, which had drilled 30 producers since discovery in 1941, and before going on production in June of last year, now has 34 oil wells which produced 1,622,550 barrels during 1945.

Discovery of commercial production in the Llanos area of southeastern and eastern Colombia would present an additional problem of transportation, since a pipe line would be forced to traverse some of the highest ranges in the Colombian Andes. It has been estimated that discoveries in the area would have to amount to a minimum of a billion barrels, possibly more, to justify such a line. Maintenance of such a line, like the original construction cost, would be tremendous.

Colombia Production and Completion Data

YEAR	PRODUCTION (Barrels) Annual Production	Avge. Daily Production	COMPLETIONS Oil	Dry	Total
1940	25,564,655	69,849	98	10	108
1941	24,645,347	67,521	41	11	52
1942	10,619,678	29,095	16	17	33
1943	13,463,558	36,886	13	6	19
1944	22,770,142	62,214	23	10	33
1945	22,756,782	62,347	49	10	59

DRILLING

The type of production in Colombia is well illustrated by present drilling trends, which show a high percentage of wildcatting as compared with field drilling. Last year 59 wells were completed, of which ten were wildcats with two productive. The remainder of the drilling was in producing areas, with La Cira, at De Mares and Tibu on the Barco accounting for 26 field wells. Any great volume of drilling will depend upon opening of producing areas for active exploitation. The country has had two peaks in drilling activity, one from 1928 to 1930 when a total of 362 wells were completed. This came during the period of intensive development of the La Cira

Colombia Completion Data Up to December 31, 1944

COMPANIES	Concessions	Years	Total Feet Drilled	Total of Wells Completed: Producers	Dry	Total
Tropical Oil Co. (Standard, N.J.)	De Mares	1922-1944	3,367,499	1,151	42	1,193
	Putana	1935-1938	15,044	....	3	3
	Sonaca	1938-1940	20,567	....	3	3
	Cimitarra	1941-1942	13,673	....	2	2
Colombian Pet. Co. (50% Texas—50% Socony)	Barco	1933-1944	296,093	157	16	173
Socony Vacuum Oil Co.	Restrepo	1937-1940	41,894	1	6	7
	McCarthy	1941-1942	5,438	....	1	1
	Cantagallo	1941-1944	30,357	2	3	5
	Floresanto	1944	4,855	....	..	.....
Richmond Petr. Co. (Standard of Calif.)	Taracue	1941-1942	6,342	....	5	5
	San Pablo	1942	1,931	....	2	2
	Canabraval	1941-1943	7,515	....	6	6
	Arjona	1943-1944	7,316	....	2	2
	Chorrea-Manteca	1944	2,782	....	..	.....
Cia. de Petr. Shell (Royal Dutch Group)	San Juan	1938-1940	13,614	....	2	2
	Monte Oscuro	1939-1940	12,120	....	2	2
	Consorcio	1939-1940	11,446	....	3	3
	Palagua	1941	3,527	....	1	1
	Yondo	1941-1944	116,741	25	2	27
	El Doce	1942-1944	28,859	....	3	3
	El Dificil	1942-1944	22,625	2	1	3
	San Angel	1943-1944	17,234	....	2	2
	San Martin	1944	3,117	....	1	1
	Chafurray	1945	.....	....	..	.....
Total	.....	.....	4,050,589	1.338	108	1,446

Engineering and Geological Data on Colombia Oil Fields

Concession, State and Field	Location on Map Page 127	Proved Area (Acres)	Gravity of Oil	PRODUCING FORMATION: Name	Kind	Age	Depths of Wells (Ft.): Minimum to Top of Pay	Maximum Total Depth of Wells (Ft.)	Type Structure
De Mares Concession (Santander)									
Infantas	E-5	5,300	24.5	Zones A, B, C	Sand	Olig.-Eo.	300	2600	Faulted Anticline
La Cira	E-5	4,700	24.5	Zones A, B, C	Sand	Olig.-Eo.	200	4300	Faulted Anticline
Barco Concession (Sant. del Norte)									
Petrolea	D-6	4,000	46	La Luna, Ostrea, Zones 1, 2, 3, 4	Limestone	Cretaceous	....	1953	Anticline
Rio de Oro	D-6	400	38	Catatumbo, Rio de Oro, Uribante	Shales, Sand, Limestone	Cretaceous	....	1865	Faulted Anticline
Carbonera	...	....	21	Cuerros, Barco	Sand	Eocene	....	3359	Faulted Anticline
Tibu	D-6	8,000	33	Barco, Catatumbo, Uribante	Shale, Sand, Limestone	Cretaceous	....	5339 9110	Anticline
Yondo Concession (Antioquia)									
Casabe	E-5	3,000	21	La Cira, Colorado	Sand	L. Mio-Olig.	....	3772	Faulted Anticline
Cantagallo Concession (Bolivar)									
Cantagallo	E-5	....	20	Esmeraldas, La Paz	Sand	Olig.-Eo.	....	6170	Faulted Anticline
El Dificil Concession (Magdalena)									
El Dificil	C-5	....	44	El Dificil	Limestone	Oligocene	....	5900	Faulted Anticline

GENERAL Houses Oil Men Throughout the World

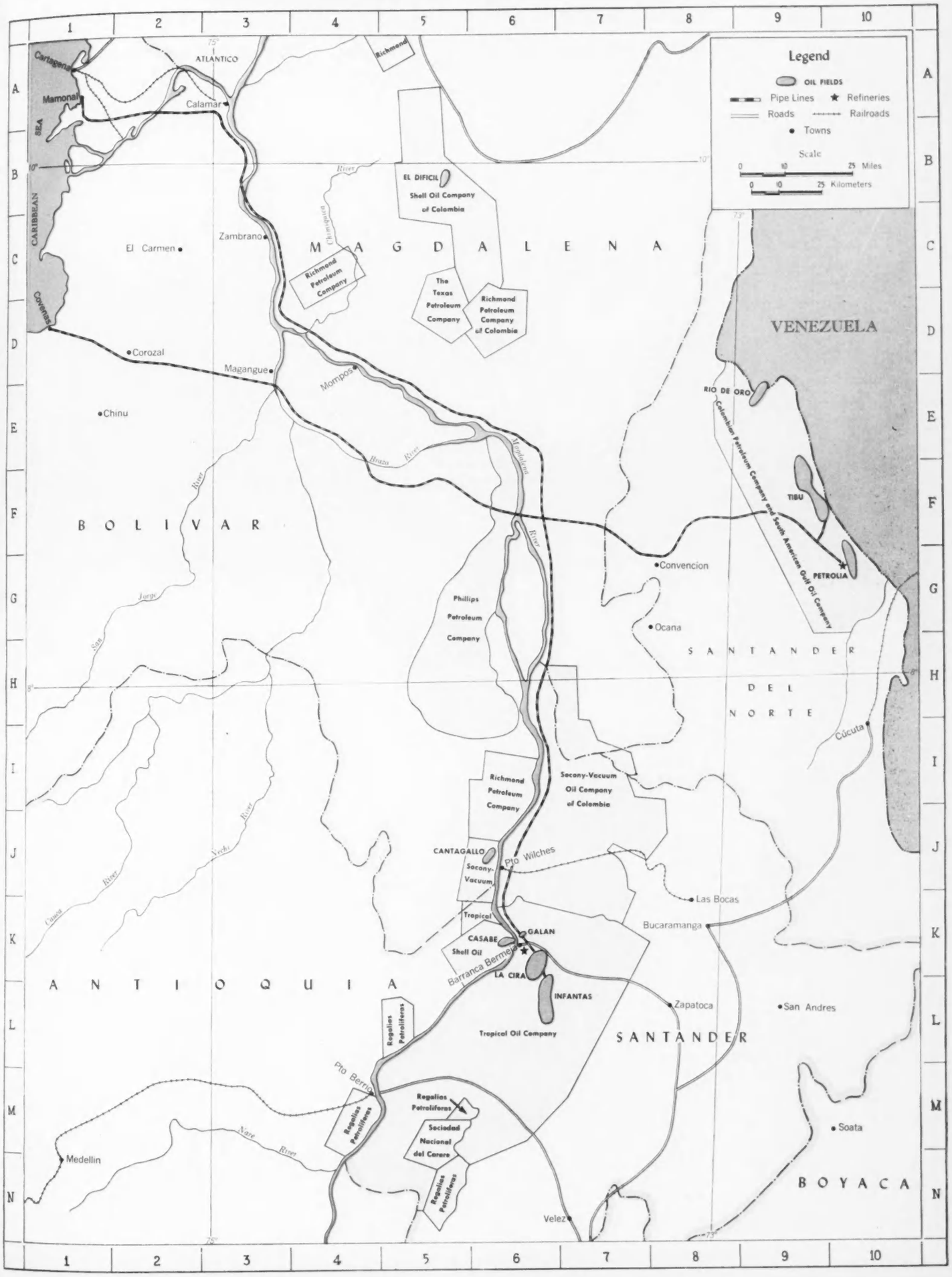
In the shadow of great cities and in some of the world's most inaccessible places—where conventional housing materials cannot be transported—you will find GENERAL'S famous, sturdy HOMETTES and compact camp installations . . . providing low-cost, comfortable living and working conditions for men who work in oil. Bunk houses, mess halls and office buildings . . . quickly erected . . . demountable . . . portable . . . built for enduring comfort in all kinds of climates. Men who *know* say: "GENERAL HOUSING is *engineered to the times!*"

Write for Free Descriptive Catalogue in Full Color

General HOUSING COMPANY

2121 N. BECKLEY DALLAS 8, TEXAS

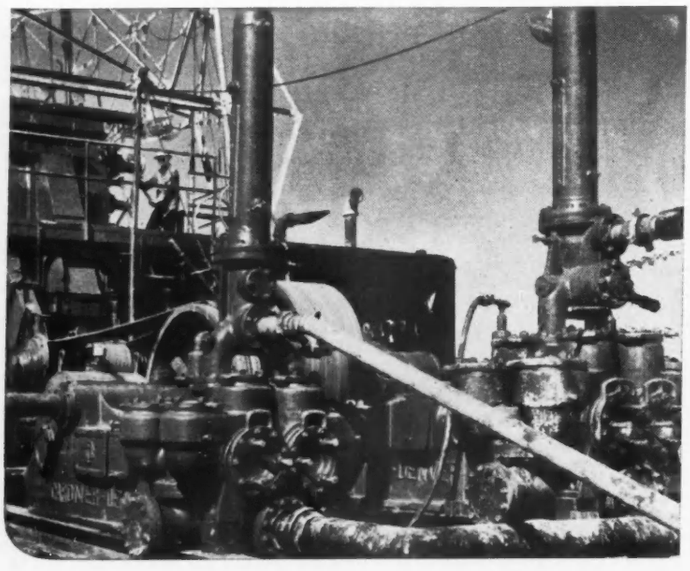
COLOMBIA—Oil Concessions



All over the world means *Reliability*

Appearing on Gardner-Denver Power Slush Pumps, Steam Slush Pumps, Oil Line Pumps and Drilling Engines, the Gardner-Denver emblem has become a symbol of reliability in oil service throughout the world. For Gardner-Denver has specialized in better designed equipment for oil production and oil transportation . . . equipment offering special advantages in efficiency and sturdiness.

For example, the Gardner-Denver "FX" Power Slush Pump is built to prevent mud and water from entering the power end. Water-flushing pipes keep the rods clear of any mud escaping from fluid end stuffing box. A mud stop head, a water deflector and an oil stop head are provided to remove any water and any particles of mud that might remain.



The Gardner-Denver "FX" Power Slush Pump is built for long service

- Fluid cylinders, frames and other parts cast in GarDurloy for extra strength and resistance to wear.
- Divided fluid cylinder construction—no inner baffles to be cut through by mud.
- Rugged main frame cast in one piece for greater resistance to shock loads.
- Positive flood type lubrication to all working parts.
- "Slush-proof," hardened liners, rods and valves.

For complete information, write Gardner-Denver Company, Quincy, Illinois. Export Office: 233 Broadway, New York, N. Y., U.S.A. Dallas, Houston, Tulsa, St. Louis, Los Angeles, San Francisco, New York, Chicago, Pittsburgh, Denver; Continental Supply Co., Continental Bldg., Dallas, Texas; Republic Supply Company (of California), 2122 E. 7th Street, Los Angeles, California.

GARDNER-DENVER

Since 1859

COLOMBIA—Continued

and Infantas fields. Another peak came from 1938 to 1940, exactly 10 years later when 401 wells were drilled, accounted for by another spurt in activity at Infantas and La Cira and by a period of intensive work at Petrolea.

The wildcatting program is hampered by the concession system. Much geophysical work has been done, and is still in progress. Prospects are being found but companies find it impossible to drill pending final action by the Supreme Court which passes on all concessions. Considerable delay invariably results from this procedure.

Twelve wildcats were being drilled at the close of 1945 in various parts of the country and there was an increase in prospect for 1946.

REFINERIES

Most of Colombia's crude oil production is exported, and refining capacity amounts to only 17,700 barrels daily, about balancing the domestic demand for refined products in the country. Most of this demand is met by the *Tropical Oil Company* refinery at Barrancabermeja, located on the Magdalena River on the De Mares concession. It is a complete plant with throughput capacity of 17,000 barrels daily and is supplied by crude from the de Mares concession entirely. Products are transported to outside points by river barges.

Colombian Petroleum Company operates a small, 700-barrel plant in the Petrolea field, and supplies products, including diesel fuel and gasoline, to the area around Cucuta, in the extreme eastern portion of the country as well as products for company needs.

No other plants are presently planned.

PIPE LINES

Present fields in Colombia are located hundreds of miles from tidewater, necessitating long and expensive lines through difficult country. Two principal lines handle present output.

Andian National Corporation, Ltd., operates from El Centro on the De Mares concession to the terminal at Mamonal, near Cartagena on the Caribbean coast, a 334-mile, looped 10-inch line, capacity 55,000 brarels daily. It is presently operating at full capacity, carrying crude from De Mares plus the production by Shell from the Casabe field on the Yondo concession. Shell's oil is delivered through an 8-inch line across the Magdalena River from Casabe with one pump station at point of origin. The Andian line with its 9 pump stations, parallels the Magdalena River most of the way.

South American Gulf Oil Company operates from Petrolea in the Barco to the Caribbean terminal at Covenas, a 260-mile 12-inch line which has capacity of 75,000 barrels daily. All of its three pump stations are situated in the first 75 miles of line which crosses the mountains at an altitude of one mile. Another station is located on the west slope of the mountains which is purely a relief station, where oil is flowed into tanks and turned back in the line to relieve pressure caused by the drop in altitude.

Oil from Tibu is brought into the Petrolia station through a 6-inch pipe line, but present plans are to change the main station to Tibu and feed Petrolea crude through the 6-inch system.

TRAVEL FACILITIES

Airlines—Travel in Colombia must be almost entirely by air. Pan American Airways service into the country is available from Miami to Barranquilla, from New Orleans by way of the Canal Zone, or from Mexico City via Colon with stops at Cartagena and Barranquilla. Connecting service to interior points is available through Avianca, a local affiliate of PAA, connecting to Bogota, Barrancabermeja, Medellin, Bucaramanga, and Cucuta. Taca Airlines has extended its service into Colombia with connections from Mexican and Central American points. Points on the west coast are served also by Uraba, Medellin, & Central Airways with connections to PAA system at Turbo.

All principal operating companies have private aircraft for transport of personnel and materials, and transportation to areas of activity may be arranged through officials at New York or Bogota. All of the principal companies maintain headquarters in Bogota.

Railroads offer only limited service in the central portion of the country, with none of the principal oil centers available to the coast by means of rail service.

River Boats serve the Magdalena River area from Barranquilla to points above Bogota, and carry some passengers, although travel is slow and uncertain.

LODGING

In the main cities, excellent hotel facilities are available, but arrangements must be made with company officials for stay at company camp guest houses while in the field. Hotels include:

Bogota, Hotel Granada and Hotel Regina.
Barranquilla, Hotel Del Prado.
Cucuta, Hotel Palace and International Hotel.
Cartagena, Hotel Caribe.
Bucaramanga Hotel Bucarica.
Barrancabermeja, Hotel Pipaton.

* * *

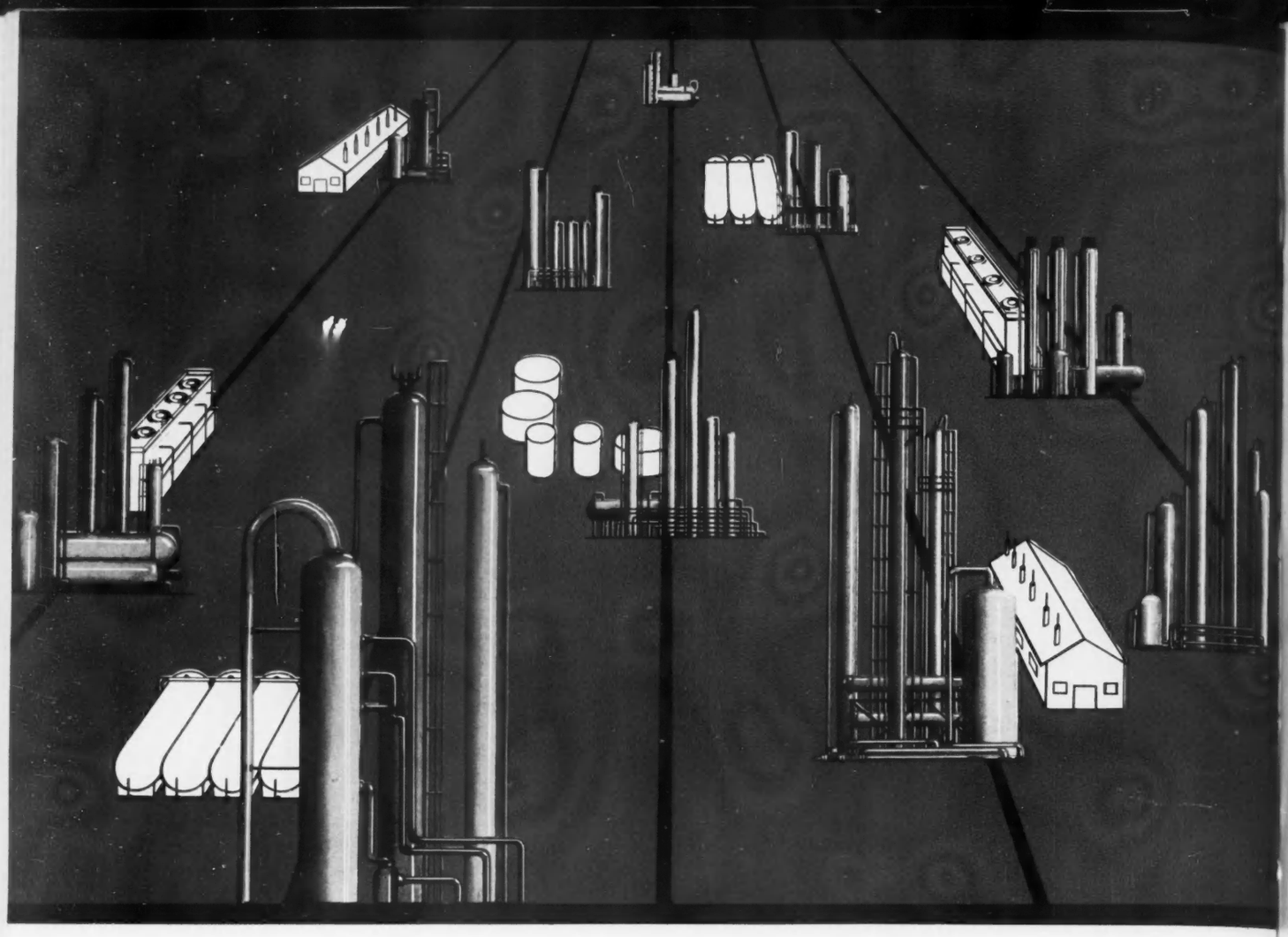
The cooperation of Hernando Madero Paris, ingeniero director, Ministerio de Minas y Petroleos, Republica de Colombia, Bogota, is gratefully acknowledged.

Recent and Prospective Drilling in Colombia

Field, State	Wells Completed in Fields in 1945				Field Wells Drilling, Rigging Up, and Shut Down at End of 1945			*Drlg. Prospect, 1946
	Oil	Dry	Total Wells	Total Footage	Dr	SD	Total	
Casabe, Antioquia	9	..	9	33,518	2	..	2	+10%
Cantagallo, Santander	1	..	1	7,322	2	..	2	+25%
El Dificil, Magdalena	5	..	5	29,047	1	..	1	+20%
Infantas, De Mares Concession, Santander	4	3	7	22,883	..	..	..	....
Galani, Santander	1	..	1	9,158	1	..	..	+200%
La Cira, Santander	15	..	15	33,774	3	..	3	—10%
Tibu, Norte de Santander	11	..	11	59,449	2	1	3	+30%
Colorado, Santander	1	..	1	4,680	1	..	1	....

Colombia Wildcats Completed in 1945

STATE	Company, Well	Date Completed	Total Depth (Feet)	Results
Bolivar	Sinu Oil Co.'s Floresanto 2	10-21-45	1985	Dry
Bolivar	Sinu Oil Co.'s Floresanto 3	10-22-45	2065	Dry
Bolivar	Sinu Oil Co.'s Floresanto 4	12-20-45	1504	Dry
Bolivar	Sinu Oil Co.'s Floresanto 1	12-18-45	6936	50 B/D Discovery, Sinu field, Sand, Miocene, 620-650 feet.
Meta	Shell Oil Co.'s Chafurray 1	6-22-45	1745	Water well
Meta	Shell Oil Co.'s Chafurray 2	10-27-45	2188	Dry
Magdalena	Shell Oil Co.'s Brillante 2, El Doce Concession	2- 7-45	4786	Dry
Magdalena	Richmond Pet. Corp.'s Chorrea 1	3-10-45	1260	Dry
Magdalena	Richmond Pet. Corp.'s Chorrea 2	1-24-45	3289	Dry
Santander	Tropical O. Co.'s Galan 1 De Mares Concession, 1 mi N of Barrancabermaja	8-10-45	5003	1400 B/D 20-gravity open tube miocene, sand.



Avenues of Progress

Hudson personnel has specialized in process design from the early days of single product absorption gasoline plants, when a plant processing 12 million feet daily was considered a large project, to the present era of high pressure plants in unitized fields, processing up to 350 million feet daily and producing as many as nine different liquid products.

The total gas capacity of Hudson-designed plants in operation or under construction exceeds two billion standard cubic feet daily.

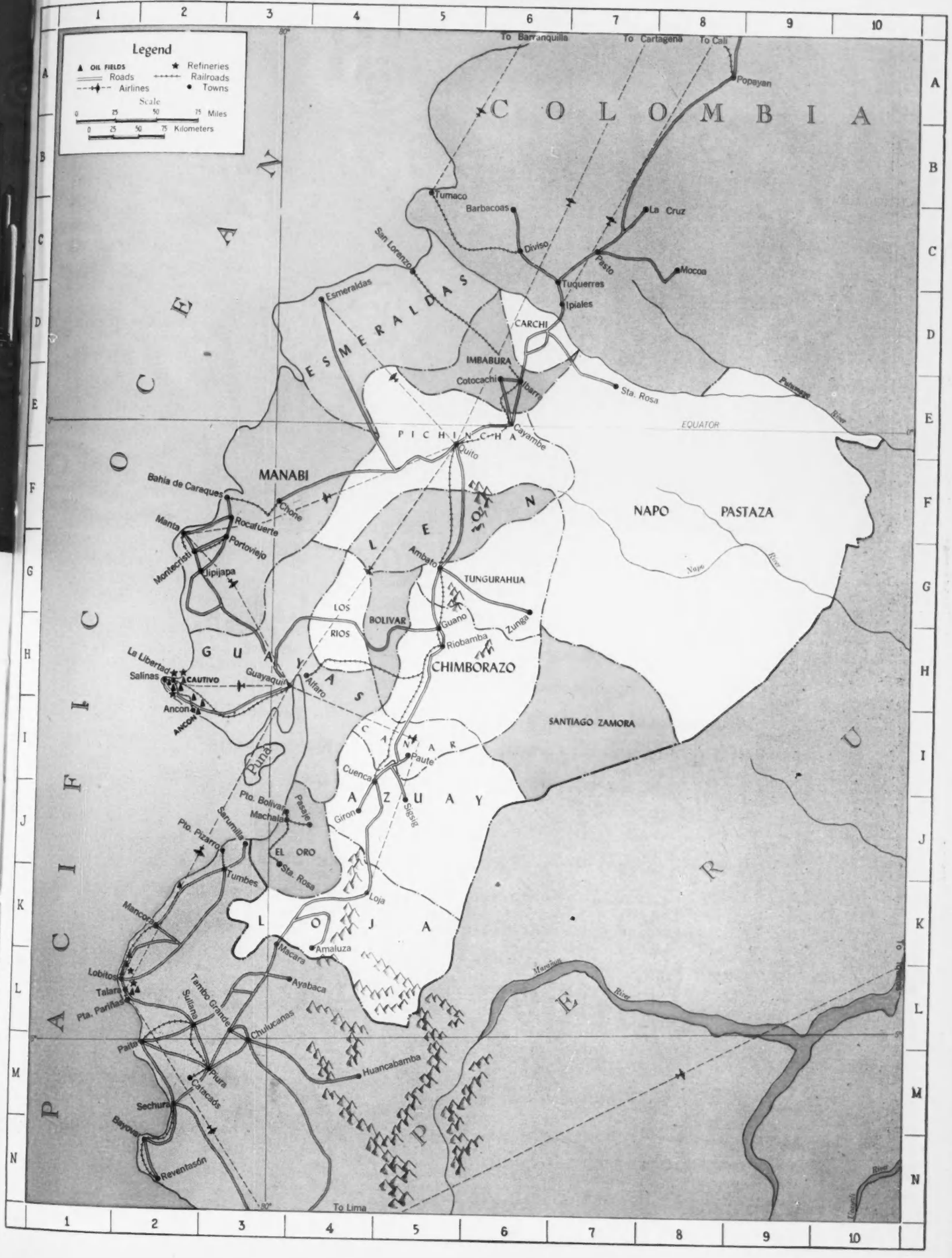
GAS COMPRESSOR STATIONS • CYCLING PLANTS • GAS DEHYDRATION PLANTS • NATURAL GASOLINE PLANTS • FRACTIONATION UNITS • CRUDE TOPPING UNITS • PRESSURE MAINTENANCE PLANTS • HYDROGEN SULPHIDE REMOVAL PLANTS • ATMOSPHERIC AND VACUUM DISTILLATION UNITS

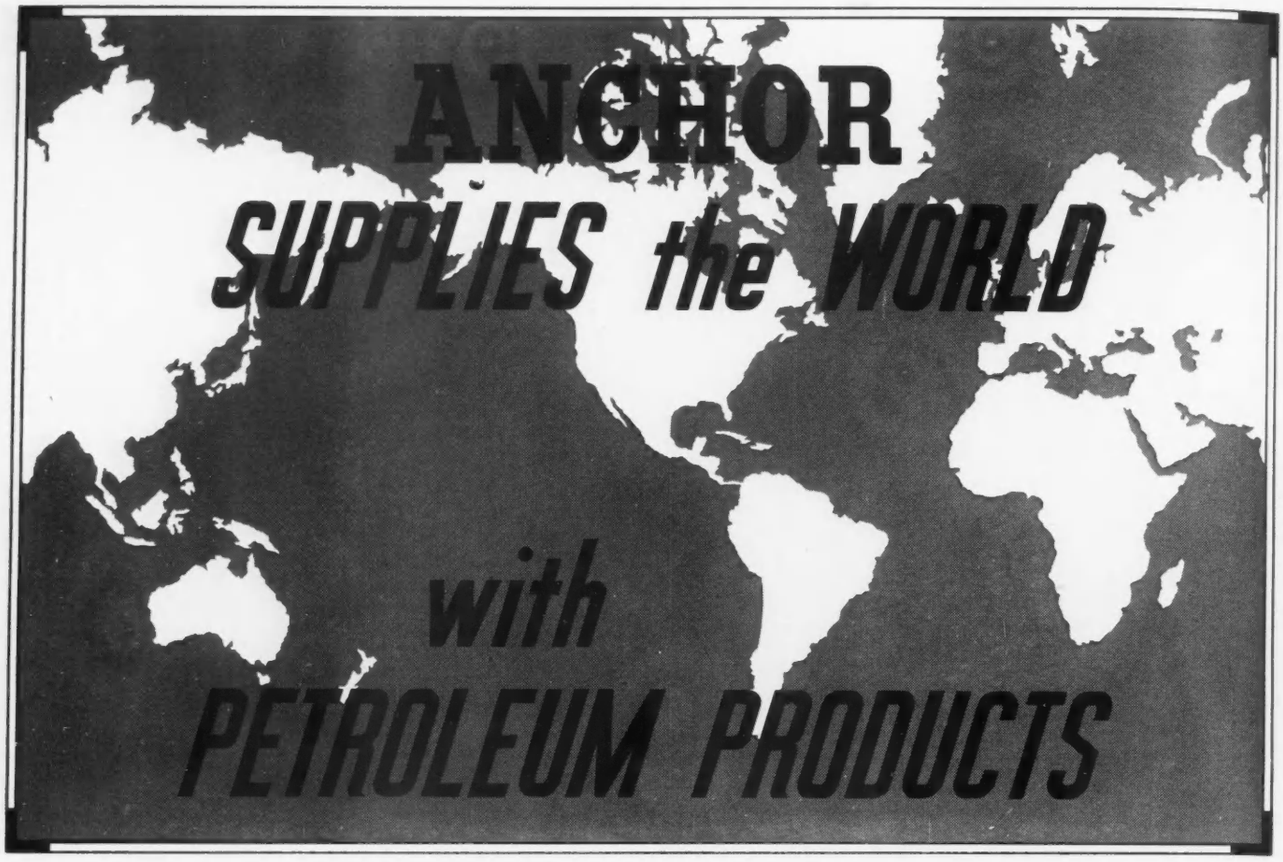
HUDSON ENGINEERING CORPORATION

Engineers and Constructors

FAIRVIEW STATION • HOUSTON, TEXAS

ECUADOR


Legend
OIL FIELDS
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 25 50 75 Miles
0 25 50 75 Kilometers
COLOMBIA
To Barranquilla
To Cartagena
To Cali
Popayan
Tumaco
Barbacoas
La Cruz
Diviso
Pasto
Mocoa
San Lorenzo
Esmeraldas
Tuquerres
Ipiales
ESMERALDAS
CARCHI
IMBABURA
Cotocachi
Ibarra
Sta. Rosa
Putumayo River
EQUATOR
PICHINCHA
Cayambe
Quito
MANABI
Bahia de Caraques
Chone
Manta
Rocafuerte
Portoviejo
Montecristi
Jipijapa
NAPO
PASTAZA
Napo River
Ambato
TUNGURAHUA
LOS RIOS
BOLIVAR
Guano
Zunga
Riobamba
CHIMBORAZO
La Libertad
Salinas
ACAUTIVO
Guayaquil
Alfaro
Ancon
ANCON
GUAYAS
SANTIAGO ZAMORA
CAÑAR
Paute
Cuenca
AZUAY
Puna
Pto. Bolivar
Machala
Pasaje
Giron
Sigsig
Pto. Pizarro
Zarumilla
EL ORO
Sta. Rosa
Tumbes
Loja
Mancora
LOJA
Macara
Amaluza
Lobitos
Talara
Pta. Pariñas
Ayabaca
Tambo Grande
Sullana
Chulucanas
Paita
Piura
Huancabamba
Caracads
Sechura
Bayovar
Reventasón
PACIFIC OCEAN
ORIENTE
Morona River
Marañon River
Curaray River
To Lima
80°
1 2 3 4 5 6 7 8 9 10
A B C D E F G H I J K L M N



With increasing world-wide demand, Anchor meets the need with specialized exporting of natural gasoline, butane, propane and all petroleum products. Our facilities are complete. We produce, refine and market, and Anchor shipments are made from strategically located export terminals.

Buyers and sellers can depend on Anchor. Our many years of experience and our ability to ship promptly is winning for us an ever-increasing number of friends and customers. Send us your inquiries.

ANCHOR Oil Company

HOUSTON, TEXAS

AFFILIATED WITH

ANCHOR PETROLEUM COMPANY • TULSA, OKLAHOMA

Anchorgas

A GOOD NAME TO REMEMBER

ECUADOR

GEOLOGY

GEOLOGICALLY, Ecuador can be divided into three provinces; that area extending east of the Andes Mountains into the Amazon River country of Brazil, known as the Oriente, the plateau country between the mountain ranges, and the coastal region west of the Andes to the Pacific Ocean.

The Oriente is stratographically and geologically an oil country. Cretaceous foraminifera are present over wide areas and there are many favorable structural conditions. Being isolated, transportation is a serious problem.

In the lower portion of the plateau country, below the city of Cuenca, there are seepages and evidence of structure. Geologists say it is possible that fractured conditions in this intensely folded area may retard or prevent commercial production.

The coastal area west of the Andes is a sedimentary region which gives definite evidence of petroleum deposits. In it are now the present producing fields. Along the coast, the sediments are of Tertiary age. Approaching the mountains there is evidence of Cretaceous possibilities. Indications of structure are evident in areas which have been explored and seepages are known to exist at points along the coast.

In the producing areas the oil is reported as filling fractures in the Eocene sands which are not themselves impregnated. Some observers have thus been led to ascribe the oil's origin to older formations, possibly of Cretaceous age. In the Lower Eocene is a very thick member, the Sucre sand, which has been penetrated for 3000 to 4000 feet without passing through it. The usual practice is to drill into it for 300 to 400 feet and abandon if no oil is found.

PRODUCING AREAS

Crude oil production in Ecuador totaled 2,663,726 in 1945 and 2,966,979 barrels in 1944 with cumulative through 1945 of 35,891,239 barrels.

The largest producing area in Ecuador is the Ancon fields in Guayas Province on the concession of Anglo-Ecuadorian Oilfields, Ltd. Ecuador Oilfields, Ltd., has production on the Santa Elena Peninsula at Tigre and Cautivo. Concepcion Ecuadorian Oilfields, Ltd., produces in the Concepcion and San Francisco claims in Guayas Province. The small production of Carolina Oil Company is located at Santa Paula and LaLibertad in Guayas Province while Petropolis Oil Company has a few wells in the Petropolis-Salinas area. International Ecuadorean Petroleum Company's only production is located in El Tambo field.

CONCESSIONS IN ECUADOR

Concessions in Ecuador totaling 12,053,864 hectareas (29,785,098 acres) are held by eight companies with oil being produced on concessions operated by six of the companies.

The largest concession is held by Shell Company of Ecuador, Ltd. This concession totals 10 million hectareas (24,710,000 acres) and is located in the Oriente, or eastern Ecuador. Shell has drilled one dry hole on its acreage.

The next largest concession holder in Ecuador is the International Ecuadorean Petroleum Company (Imperial Oil Company of Canada and Standard Oil Company (New Jersey). International's concession totals 1,843,998 hectareas (4,556,619 acres) and is located along the coast from Isla Puna, Bay of Guayaquil, near the Peruvian border on the south, to the Colombian border on the north. International has very little production but is conducting a most active wildcat program.

Anglo-Ecuadorian Oilfields, Ltd., holds concessions totaling

Oil Wells and Production of Ecuador

FIELD, PROVINCE	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)			
		Shut in	Producing			Daily at End of 1944	Year 1944	Estimate Year 1945	Cumulative Through 1945
			Flowing	Art. Lift	Total Producing				
Ancon, Guayas	1921	45	40	530	570	5,527	2,151,392	1,966,358	[1]30,846,608
Carolina-Sta. Paula, Guayas	....	50	....	23	23	87	36,249	56,292	882,164
Concepcion, Guayas	1931	1	4	12	16	432	93,839	103,286	576,798
El Tambo, Guayas	1931	....	....	....	....	2.4	751	832	13,150
Tigre, Guayas	1938	....	13	2	15	1,260	520,195	434,886	3,039,357
Cautivo	1920	....	....	39	39	105	41,586		
Petropolis, Guayas	1937	1	2	4	6	285	125,957	102,072	533,162

[1] Includes production of Ecuador Tropical Oil Company.
Note: All information except 1945 production from Ministry of Economy, Industry and Mines, Quito.

Engineering and Geological Data on Ecuador Oil Fields

FIELD AND PROVINCE	Location Map Page 139	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						Type Structure
				Name	Kind	Age	Depth of Wells (Ft.) Minimum to Top of Pay	Depth of Wells (Ft.) Maximum Total Depth of Wells	Avg. Thickness of Pay (Ft.)	
Ancon-Sta. Elena, Guayas	I-4	.....	37-41	Socorro Atlanta	Sandstone	Eocene	1200 3900	1800 6000	600 2500	Faulted anticline
Cautivo, Guayas	G-3	.....	39-44	Socorro	Sand	Eocene	750	1000	250	Steeply dipping erratic blocks.
Carolina, Sta. Paula, Guayas	H-2	.....	28-31	Socorro	Sand	Eocene	632	836	200	Steeply dipping erratic blocks.
Concepcion, Guayas	I-4	.....	38	Atlanta	Sand	Eocene	....	4090	....	Structural strat. trap.
El Tambo, Guayas	I-4	.....	.....	Socorro	Sand	Eocene	.....	3293	....	Structural strat. trap.
Tigre, Guayas	I-4	200	39	Atlanta	Sand	Eocene	2900	4300	400	Structural strat. trap.
Petropolis, Guayas	G-2	100	35	.....	Shattered Chert	Eocene	....	2000	....	Steeply dipping erratic blocks.

In the Spotlight!

Outstanding performance always wins recognition and acceptance... In the field of Wire Rope, "HERCULES" (Red-Strand) long ago won its place "In The Spotlight" because of its uniform reliability and economy in every industry that calls for "heavy duty" action.

You won't go wrong when you adopt the Red-Strand as your buying guide for wire rope. As "HERCULES" is furnished in both Round Strand and Flattened Strand construction, and in either the Preformed or Non-Preformed type—you are assured of adaptability as well as of high quality.

Ask our Engineering Department to recommend the type and construction best suited to your needs.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS
5909 KENNERLY AVENUE

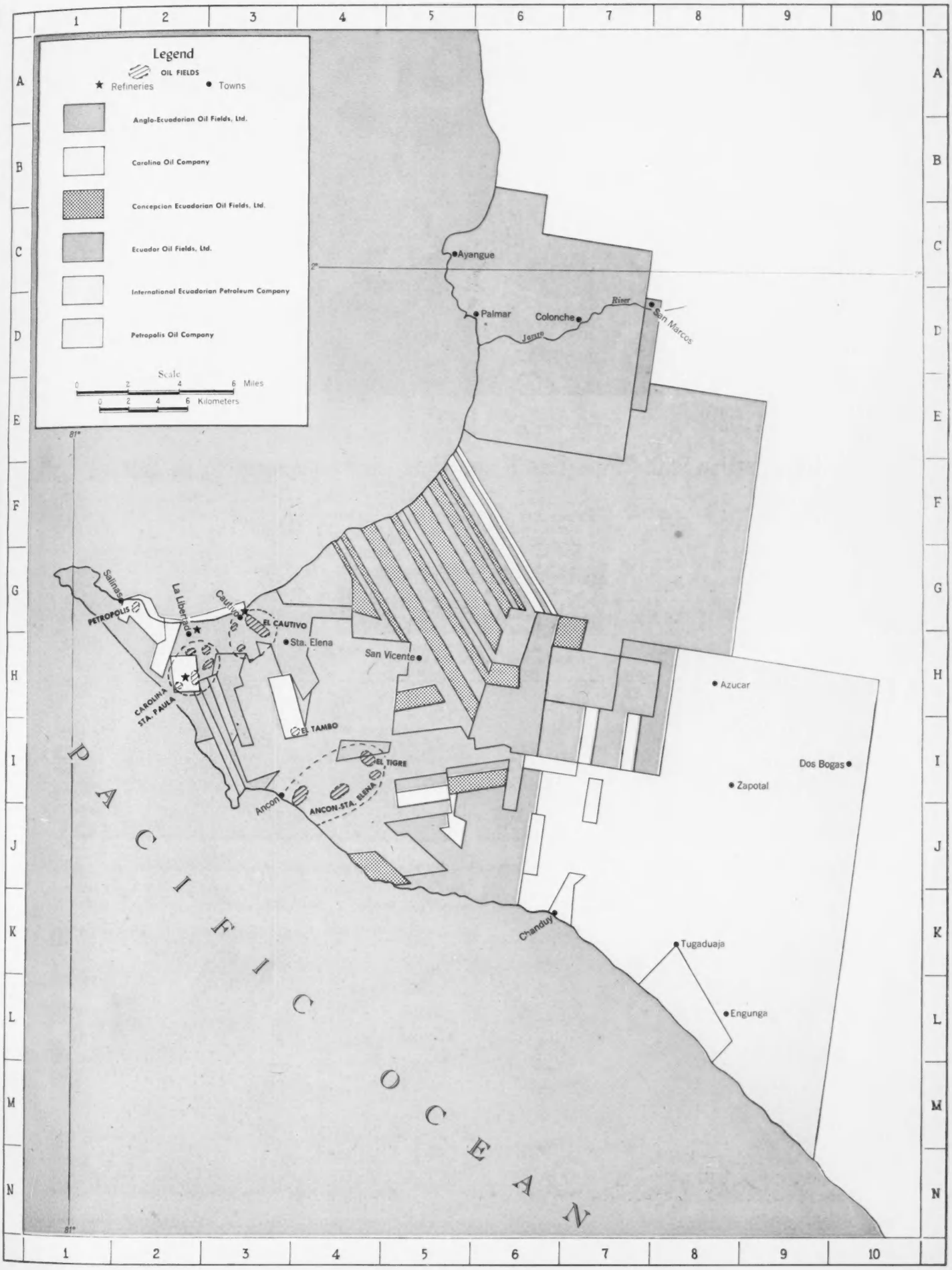
ESTABLISHED 1857
ST. LOUIS 12, MISSOURI, U. S. A.

NEW YORK 6 . . . 90 West Street
CHICAGO 7 . . 810 W. Washington Blvd.
DENVER 2 . . . 1554 Wazee Street

"HERCULES" (RED-STRAND) WIRE ROPE

SAN FRANCISCO 7 . . 520 Fourth Street
PORTLAND 9 . . 914 N. W. 14th Avenue
SEATTLE 4 . . . 3410 First Avenue South

ECUADOR—St. Elena Peninsula



J. H. SMITH
Partner

O. R. SMITH
Managing Partner

F. A. SMITH
Partner

The Organization with "Pipe Line Know How" and equipment to do the job

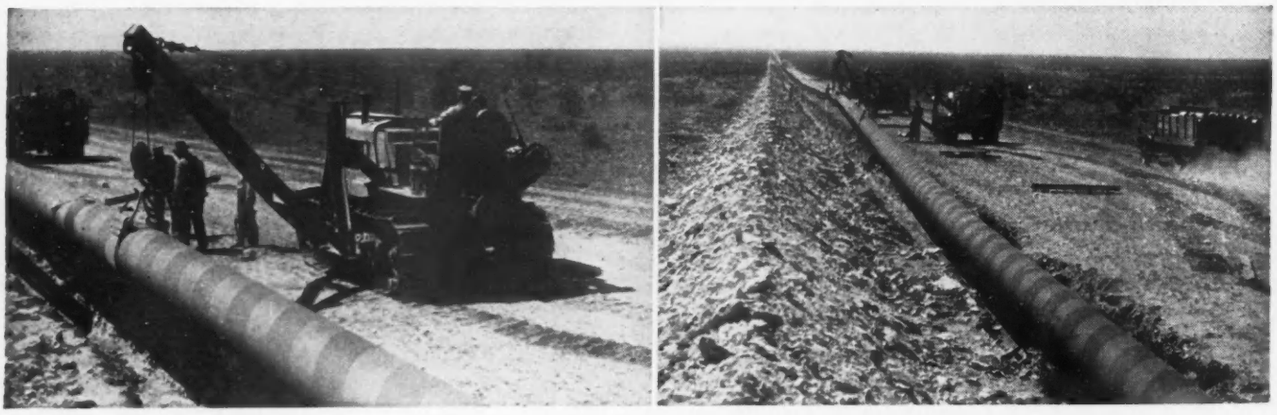
PIPE LINE CONSTRUCTION
COMPRESSORS WELDERS
DITCHERS TRUCKS
DOZERS TRACTORS

SMITH CONTRACTING COMPANY
ODESSA, TEXAS

MAIN BUSINESS OFFICE
FORT WORTH NATIONAL BANK BLDG.
FORT WORTH 2, TEXAS

Progress of any job depends upon the proper equipment at the right place and at the right time.

40 miles of 22 and 26 inch main feeder lines for world's largest Carbon Black Plant.



ECUADOR—Continued

38,686 hectareas (95,593 acres). Other concession holders are Ecuador Oil Fields, Ltd., 18,005 hectareas (44,490 acres); Carolina Oil Company, 900 hectareas (2224 acres); Concepcion Ecuadorian Oilfields, 6525 hectareas (16,123 acres); Petropolis Oil Company, 1200 hectareas (2965 acres), and Compania Petrolera del Ecuador, 144,550 hectareas (357,183 acres).

WILDCAT ACTIVITY

The most active operator in Ecuador from a wildcat drilling standpoint is the International Ecuadorean Petroleum Company. In 1943, International's footage drilled totaled 27,620 feet while in 1944 the footage was 21,501. Three tests were drilled and abandoned during 1945 totaling 21,356 feet.

At the present time, International has three rigs running and footage drilled in 1946 is expected to exceed that drilled in the three preceding years. Most of the company's drilling is in Guayas Province.

During 1945, Shell Company of Ecuador, Ltd., drilled a dry hole on its huge concession in the Oriente and the company is expected to continue its wildcat drilling program during 1946.

CASINGHEAD GASOLINE

During 1945, Anglo-Ecuadorian Oilfields, Ltd., produced 1,754,235 gallons of casinghead gasoline from a total of 2,475,113,000 cubic feet of gas treated. This is slightly higher than the 1,613,140 gallons of gasoline produced from treating 2,273,519,000 cubic feet of gas in 1944. Through 1945, Anglo-Ecuadorian had produced a net of 15,227,579 gallons of casinghead gasoline with the gas treated totaling 19,747,609,000 cubic feet.

CRUDE OIL EXPORTS

Anglo-Ecuadorian Oilfields, Ltd., largest producer in Ecuador, exported a total of 1,765,073 barrels of crude oil in 1945. Exports included 1,308,358 barrels to "high seas" (up to August, 1945, all cargoes leaving Ecuador were consigned thus): 382,527 barrels to Montivideo, and 74,188 barrels to Buenos Aires. A certain amount of casinghead gasoline was mixed with some of the crude cargoes.

* * *

The cooperation of Dr. Ernesto Alban Mestanza, Subsecretario de Industrias y Minas, Ministerio de Economia, Quito, is gratefully acknowledged.

LODGING

Hotels:

Quito—Majestic, Metropolitan.
Guayaquil—Metropolitano Hotel.

Crude Oil Pipe Lines of Ecuador

COMPANY	Origin	Terminus	Length (Mi'es)	Diameter (In.)	No. of Pump Stations	Capacity of Line (Bbls. Daily)	Year Completed	Status
Petropolis Oil Co.	Petropolis Salinas	Libertad	8	4	1	3600	1940	Operating
Carolina Oil Co.	Santa Paula	Carolina	3	4	2	2400	....	Operating
Ecuador Oilfields, Ltd. (British Controlled Oilfields, Ltd.)	Tigre	Cautivo	11	4	1	2500	1940	Operating
Ecuador Oilfields, Ltd.	Cautivo	Anglo tank-farm and submarine line	2	8 plus 10	None	30,000	1940	Operating
Ecuador Oilfields, Ltd.	Cautivo	Anglo tank-farm and submarine line	2	10	....	....	....	Planned
Anglo-Ecuadorian Oilfields, Ltd.	Ancon	La Libertad	8	6	1	12,960	1925	Operating

Ecuador Wildcats Completed in 1944 and 1945

Province	COMPANY AND WELL	Completed	Total Depth (Feet)	Results
Guayas	International Ecuadorean Pet. Co., Carrizal 1	1944	7115	Dry.
Guayas	Int. Ecu. Pet. Co., Engunga 1	1944	7440	Dry.
Guayas	Int. Ecu. Pet. Co., Daular 1	1945	8420	Dry.
Guayas	Int. Ecu. Pet. Co., Las Canas 1	1945	7006	Dry.
Guayas	Int. Ecu. Pet. Co., Bajada 1	....	....	Drilling.
Guayas	Int. Ecu. Pet. Co., Rodeo 1	....	....	Drilling.
Esmeraldas	Int. Ecu. Pet. Co., Camarones 1	1944	5118	Dry.
Esmeraldas	Int. Ecu. Pet Co., Borbon Telembi 1	....	....	Drilling.
Manabi	Int. Ecu. Pet. Co., Santa Ana 1	1945	5930	Dry.
Manabi	Int. Ecu. Pet. Co., Jaramijo 1	....	....	Drilling.
Oriente	Shell Co. of Ecuador, Ltd., Napo Pastaza 1	1945	5281	Dry; small show of heavy oil with water. Non commercial.

Refineries of Ecuador

Company Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Anglo-Ecuadorian Oilfields, Ltd., 146 Dashwood House, Old Broad St., E.C. 2, London	La Liberdad, (100 mi. w Guayaquil)	2700	None	Skimming (One lub. oil cut)	Operating
Ecuador Oilfelds, Ltd., River Plate House, Finsbury Circus, E. C. 2, London; Apto. 865, Guayaquil, Ecuador	Cuativo (Guayas, 90 mi. from Guayaquil)	600	None	Skimming	Operating
Carolina Oil Company, P. O. Box 1035, Guayaquil	Carolina	.....	.....	Skimming	Shutdown

Refined Products Produced in Ecuador During 1945

	Gasoline, Gals.	Benzine, Gals.	Kerosine Gals.	Diesel Oil, Bbls.	Lube Oil, Bbls.	Gasoil, Bbls.	Fuel Oil, Bbls.	Tar, Bbls.	Grease, Lbs.
Anglo-Ecuadorian Oilfields, Ltd.	7,125,828	568,470	2,598,043	122,628	2,857	.....	253,622	.....	7,993
Ecuador Oilfields, Ltd.	932,982	.....	412,112	10,472	63	1,268	97,736	72	.....
Carolina Oil Co.	1,045,428	.....	.....	.....	.....	.....	75,841	.....	.....
Petropolis Oil Co.	417,110	.....	.....	.....	.....	.....	40,786	.....	.....
Totals	9,491,348	568,470	3,010,155	133,100	2,920	1,268	464,985	72	7,993

DO YOU NEED
OIL TOOL EQUIPMENT

MID-CO Rotary Drilling Bit—a four-way hard formation drilling bit used throughout the world and is a major factor in reduction of time and money necessary to the drilling of deep wells in both hard and soft formations.

MID-CO Slush Pump Valve sturdily built—efficient in operation—complete in only four parts.

MEN IN THE FIELD BUY
MID-CO

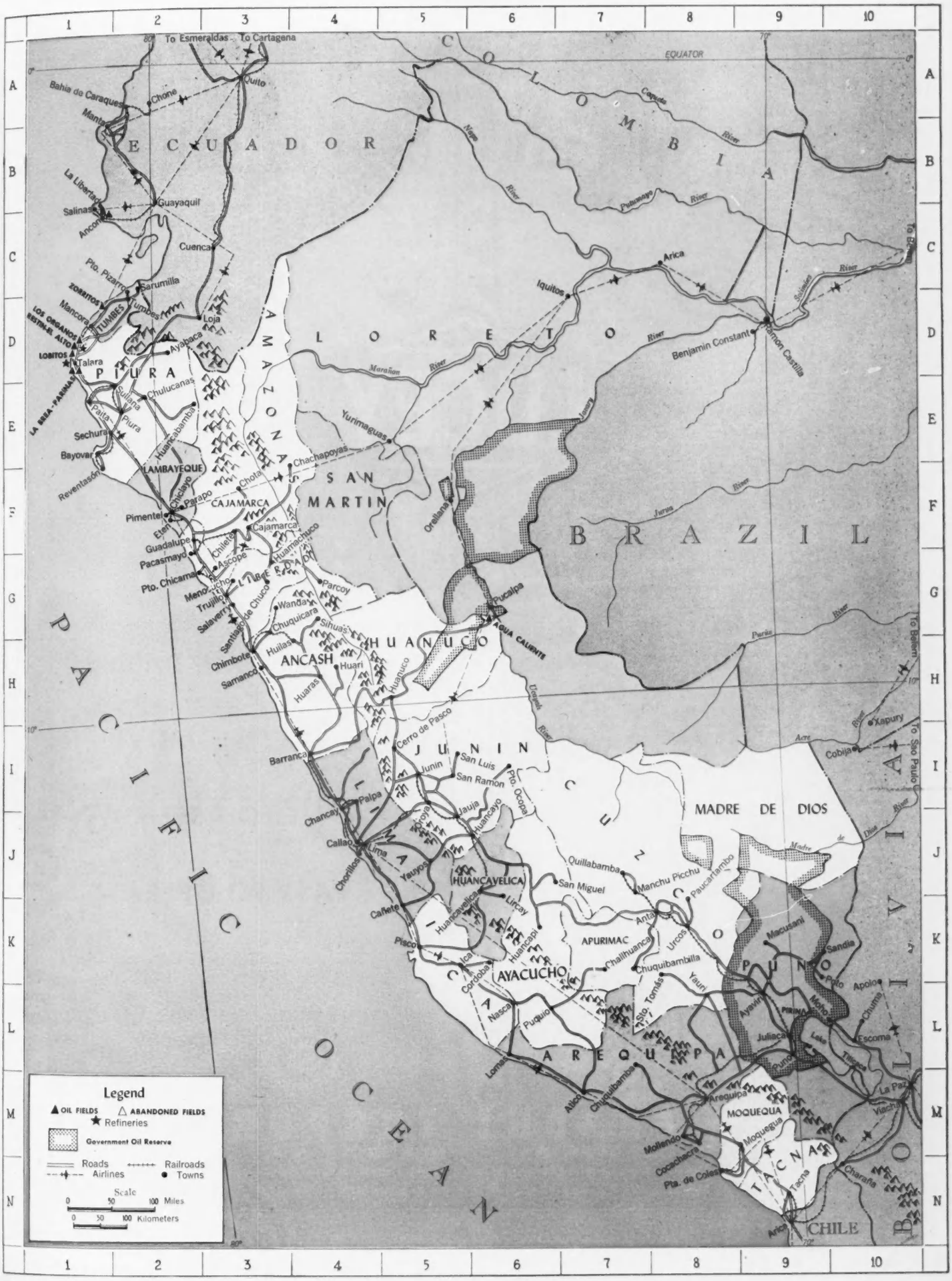
Superior performance of Mid-co Oil Tool Equipment has made them the outstanding preference in many oil fields. Mid-co specializes in Slush Pump Valves, Clean-Out Bailers and Rotary Drilling Bits. All tools are made of the best materials and designed to give you the most efficient and dependable operation at the lowest cost. For further particulars on the Mid-co Oil Tool Equipment write Mid-co Tool and Supply Co.

MID-CO TOOL & SUPPLY CO.

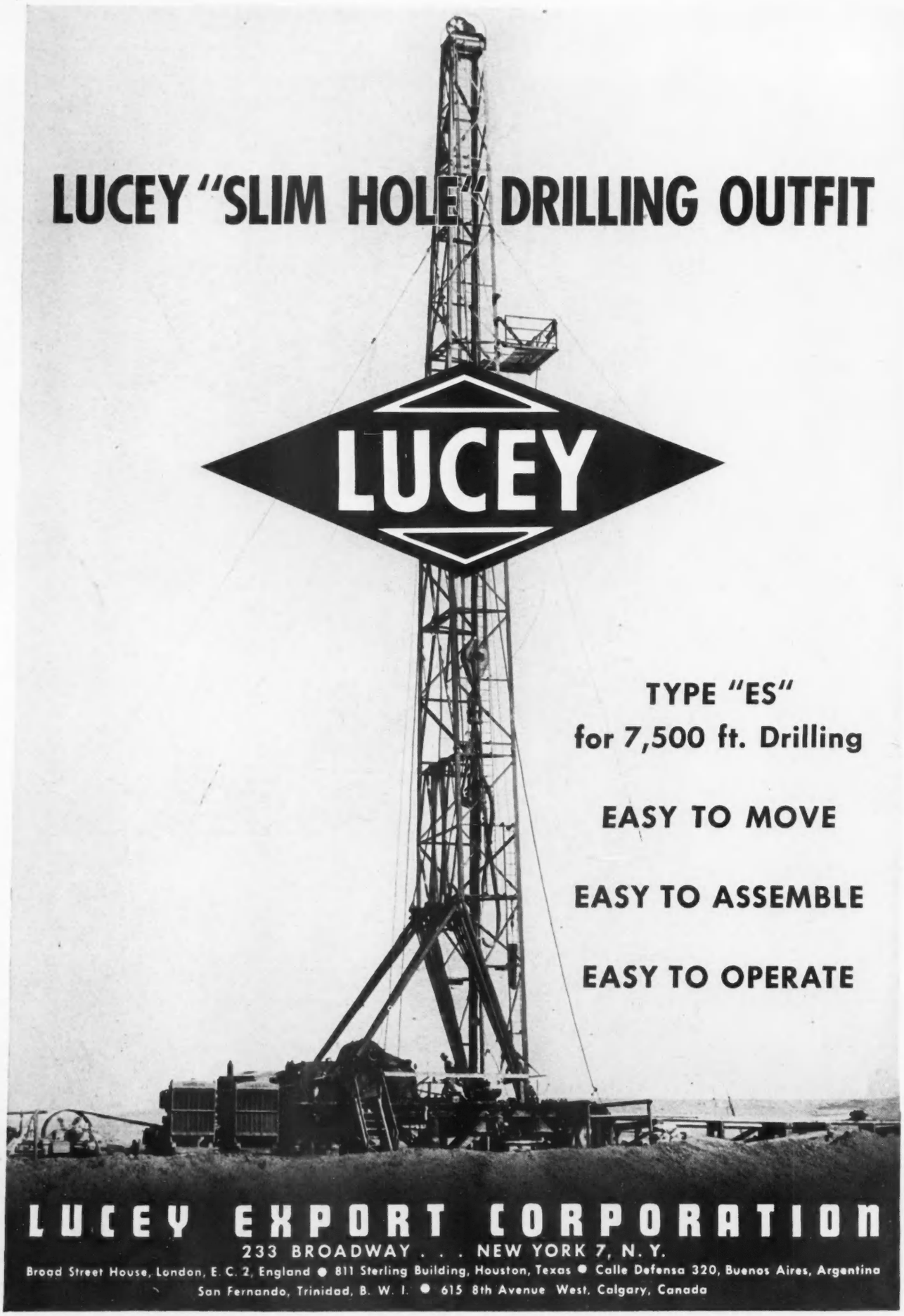
1006—1012 S. E. 29TH STREET
OKLAHOMA CITY, OKLAHOMA

SUBSIDIARY OF Aireon MANUFACTURING CORPORATION • GENERAL OFFICES, KANSAS CITY

PERU


To Esmeraldas
To Cartagena
EQUATOR
COLOMBIA
ECUADOR
BRAZIL
BOLIVIA
CHILE
PACIFIC OCEAN
Quito
Bahia de Caraquez
Chone
Manta
Guayaquil
La Libertad
Salinas
Ancon
Cuenca
Pto. Pizarro
Zorritos
Tumbes
Mancora
Los Organos
Restin. Alto
Lobitos
Talara
Loja
Ayabaca
Huancabamba
Sullana
Paita
Piura
Chulucanas
Sechura
Bayovar
Reventasón
La Brea - Parinas
Chachapoyas
Chota
Chiclayo
Parapo
Pimentel
Eten
Guadalupe
Pacasmayo
Pto. Chicama
Trujillo
Salaverry
Santiago de Chuco
Cajamarca
Chilete
Ascope
Huamachuco
Parcoy
Wanda
Chuquicara
Sihuas
Huilas
Chimbote
Samanco
Huari
Huaras
Huanuco
Pucalpa
Aqua Caliente
Oreliana
Yurimaguas
Iquitos
Arica
Benjamin Constant
Ramon Castilla
Tabatinga
Marañon River
Napo River
Putumayo River
Caquetá River
Negro River
Solimões River
Juruá River
Jurua River
Purus River
Ucayali River
Acre
Madre de Dios River
Beni River
Xapury
Cobija
To Belem
To Sao Paulo
Barranca
Cerro de Pasco
Junin
San Luis
San Ramon
Pto. Ocopa
Palpa
Chancay
Jauja
Huancayo
Callao
Lima
Chorillos
Yauyos
Cañete
Pisco
Ica
Nasca
Puquio
Lomas
Atico
Chuquibamba
Quillabamba
Manchu Picchu
Paucartambo
San Miguel
Anta
Urcos
Huancavelica
Lircay
Huancapi
Apurimac
Chalhuanca
Chuquibambilla
Yauri
Sto. Tomás
Macusani
Sandia
Pto. Apolo
Ayaviri
Juliaca
Puno
Lake Titicaca
Escoma
La Paz
Arequipa
Moquegua
Mollendo
Cocachacra
Pta. de Coles
Tacna
Tacna
Charaña
Arica
ANCASH
HUANUCO
JUNIN
HUANCAVELICA
AYACUCHO
APURIMAC
CUZCO
MADRE DE DIOS
PUNO
AREQUIPA
MOQUEGUA
TACNA
LORETO
AMAZONAS
SAN MARTIN
LAMBAYEQUE
CAJAMARCA
PIURA
Legend
OIL FIELDS
ABANDONED FIELDS
Refineries
Government Oil Reserve
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers

LUCEY "SLIM HOLE" DRILLING OUTFIT



TYPE "ES"
for 7,500 ft. Drilling

EASY TO MOVE

EASY TO ASSEMBLE

EASY TO OPERATE

LUCEY EXPORT CORPORATION

233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentina

San Fernando, Trinidad, B. W. I. ● 615 8th Avenue West, Calgary, Canada

PERU

GEOLOGY OF PERU

PERU has two distinct oil producing sectors—the coastal region in the northwestern part of the country where the Zorritos, Lobitos, La Brea and Restin fields are located, and the Sub-Andean trough on the eastern side of the Andes Mountains where the Agua Caliente field was opened in 1939.

The northwest coastal belt is underlain by Tertiary rocks lying on unmetamorphosed Cretaceous rocks in the Talara-Paita area. In general, the Cretaceous and Tertiary rocks have been deposited around and lapping against projecting highland masses—perhaps fault blocks—of the older rocks. Such masses now project above the surface near Paita and in the Cerro Illesca and Amotape Mountains.

In this sector, the Tertiary section is about 25,000 feet thick and includes more than 11,000 feet of Eocene, 8000 feet of Oligocene, 3000 feet of Miocene, and less than 1000 feet of Pliocene. The Eocene is the thickest of the Tertiary formations and has produced the most oil. The Tertiary rocks are almost entirely marine and consist mainly of ordinary shales, sandstones, and conglomerates, with only small amounts of limetone.

The Sub-Andean trough is along the eastern border of the Andes northwest from the Tambo River. Foreland folds are moderately well developed and the anticlines bring to the surface rocks of Lower Cretaceous age and reveal a Cretaceous geological section offering much promise for oil production. On one of the easternmost foreland folds in the Sub-Andean trough, Peru's first oil field east of the Andes, the Agua Caliente field, was discovered. The field is on the top of a broad dome, not far from Ucayali river, and its oil comes from the Lower Cretaceous. The Agua Caliente structure is definitely of the Rocky Mountain type.

OPERATING COMPANIES

There are six operating companies in Peru, including the government-owned company.

Cia de Petroleo Ganso Azul, Ltda., (United States), has concessions totalling about 90,000 acres on which is located the Agua Caliente field in Haunuco Province and a 500-barrel skimming plant.

Lobitos Oilfields, Ltd. and its subsidiary, Compania Petrolera Lobitos, (British), has a concession of about 131,000 acres on which are located the Restin-El Alto and Lobitos fields near Cabo Blanco. The company has a natural gasoline plant located on its holdings.

International Petroleum Company, Ltd. (Canadian), has fee lands in Piura Province on the Pacific Coast, west of the Andes. The company has oil production in the La Brea-Parinas field and operates pipe lines, tank farms, natural gasoline plants, and a refinery on the fee lands.

Plans for the expenditure of between $10 million and $12 million in the next five years by International, a Standard Oil Company (New Jersey) subsidiary, in constructing a model industrial city at Talara, port and refining center for International fields in Peru, have been announced.

Officials of the company recently said that a contract had been signed with the Peruvian government, subject to congressional approval, whereby International will pay $3½ million for a five-year exploration concession covering the Sechura desert area south of the present producing fields.

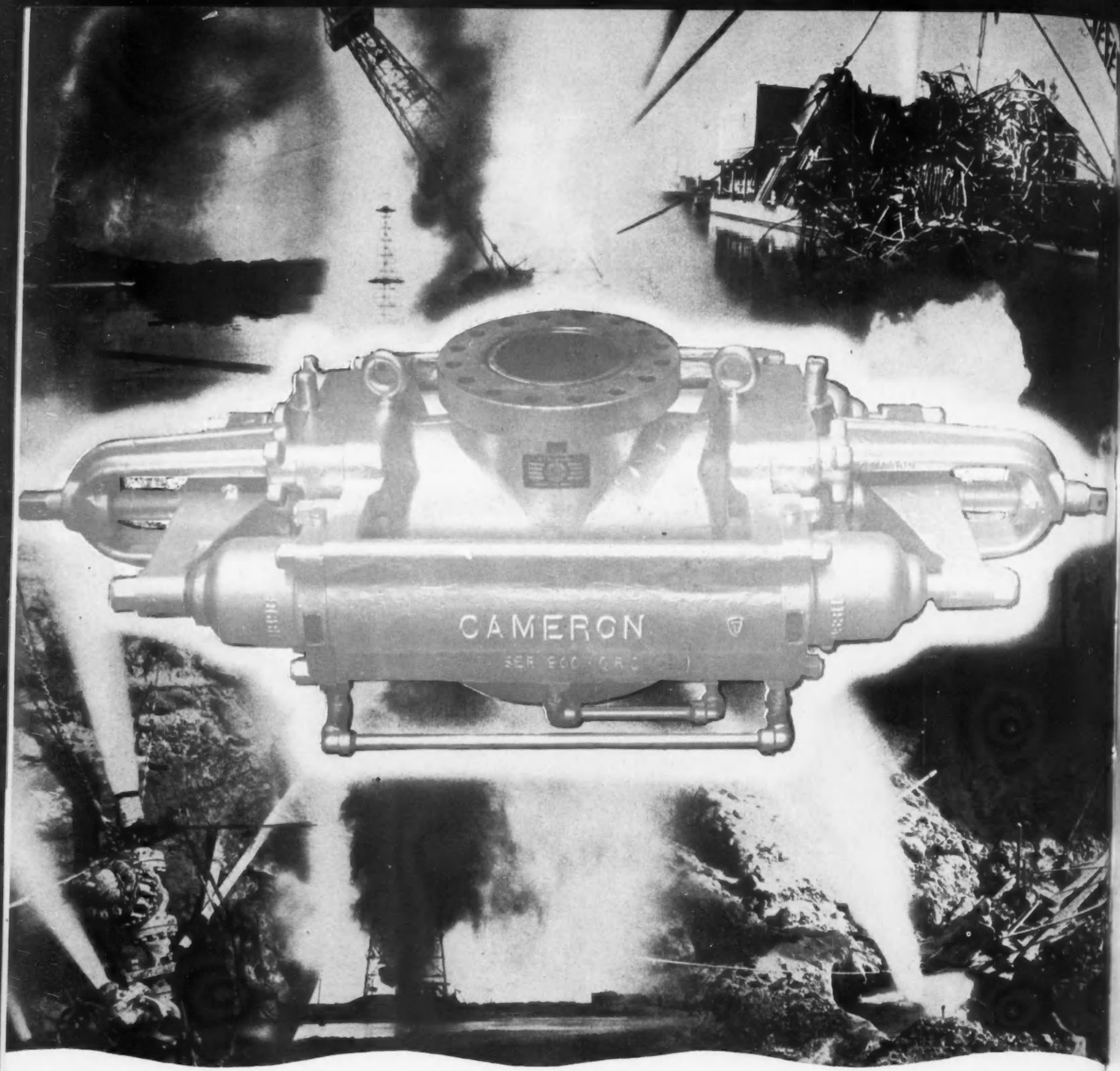
Establecimiento Industrial de Petroleo de Zorritos is the company owned by the Peruvian government. The company has production in the Zorritos and Los Organos (Constancia) fields and has a 1000-barrel skimming plant at Zorritos.

Producing Oil Wells and Production of Peru

FIELD PROVINCE	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)			
		Shut in	Producing			Daily at End of 1944	Year 1944	Estimate Year 1945	Cumulative Through 1945
			Flowing	Art. Lift	Total Producing				
La Brea-Parinas, **Piura**	1889	1	188	1,827	2,015	29,038	11,763,068	11,278,382	268,251,067
Lobitos, **Piura**	1904	....	....		824	.....	2,469,782	2,263,506	60,539,316
Restin-el Alto, **Piura**	1904	....	....						
Pirin (Huacane), **Puno**	.....	.....	.....	.....	.....	.....	.....	Abnd.	265,000
Agua Caliente **Huanuco**	1939	2	4	..	4	105	45,325	68,388	184,256
Los Organos or Constancia, **Piura**	1943	2	1	45	46	466	83,562	137,065	3,638,607
Zorritos (Tumbes)	1883				....	....			

Engineering and Geological Data of Peruvian Oil Fields

FIELD AND PROVINCE	Location on Map Page 143	Proved Area (Acres)	Probable Ultimate Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION					
					Name	Kind	Age	Depth of Wells (Ft.) Minimum to Top of Pay	Depth of Wells (Ft.) Maximum Total Depth of Wells	Type Structure
LaBrea-Parinas, **Piura**	D-1	13,500	.....	38	(Verdun, Talara, Parinas, Salina, Negritos	Sand	Eocene	60	6000	Faulted and folded
Lobitos, **Piura**	D-1	2,000	.....	26-45	Terebratula, Lower Cavenro	Sand	Eocene	3000	6000	Faulted anticline
Zorritos, **Tumbes**	D-1	400	.....	38	Zorritos	Sand	Miocene	300	1700	Faulted
Agua Caliente, **Huanuco**	G-6	.....	40,000	45	.....	.....	Lower Cretaceous	.....	.....	Anticline
Restin-El Alto, **Piura**	D-1	.....	.....	.....	Terebratula, Lower Caverno	Sand	Eocene	3000	6000	Faulted anticline
Pirin (Huacan), **Puno**	L-9	.....	.....	.....	.....	.....	.....	.....	....	Faulted and folded anticline
Los Organos or Constancia, **Piura**	D-1	.....	.....	.....	.....	.....	.....	540	1000	.....



"QRC"

There's nothing like Cameron Type "QRC" Pressure-Operated Blowout Preventers to keep things under control . . . to help make a well an asset rather than a liability. Just as the "SDA" model blowout preventer outperformed the earlier manually operated types, so does the "QRC" design set a new standard in high efficiency, low maintenance, safety and dependability. Now, more than ever before, you may entrust your well investment to these great drilling control units with the assurance that no surer safeguard has yet been devised . . . with the assurance that when drilling mud won't, "QRC" will!

ONE WAY TO KEEP A DRILLING CAMPAIGN OUT OF THE RED

"QRC" stands for quick ram change, one of the several outstanding features of this latest model Cameron blowout preventer. To change the largest size rams requires only a few minutes, an improvement which will pay for the unit in labor and rig time saving alone. Closing pressure of 1000 pounds will seal against approximately 8000 pounds well pressure, or a ratio of 8 to 1 as compared to 3 to 1 on earlier models. A pressure by-pass below the rams contributes to this more favorable operating condition and tends to hold the rams in closed position rather than force them apart. Lower overall height, less weight, and 10,000 lb. test pressure models are still other new "QRC" features.

Replace your obsolete and inadequate drilling control equipment now with Cameron "QRC" Blowout Preventers. Descriptive literature will gladly be sent to interested operators on request.

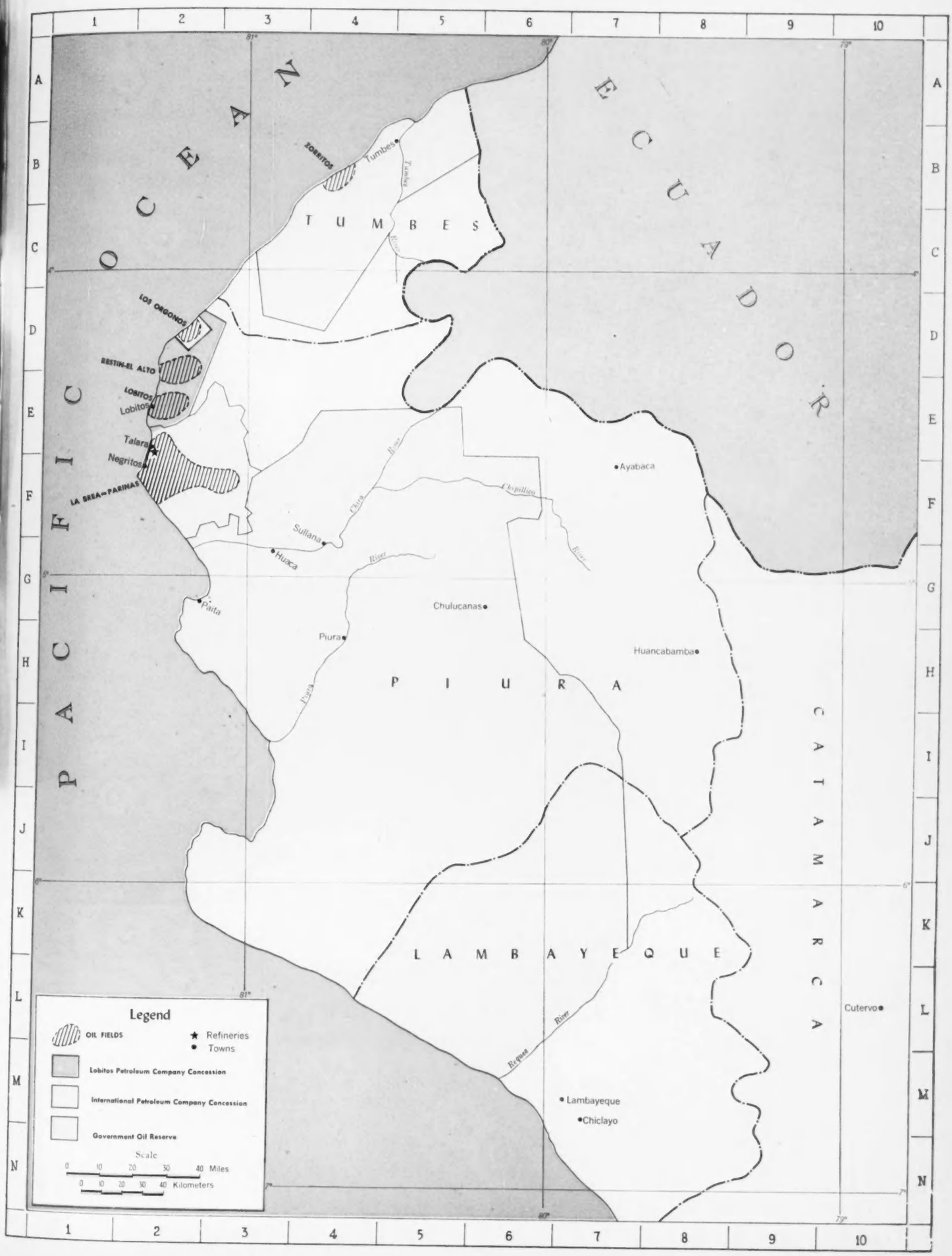
"QRC"

CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. *California:* The Howard Supply Co., Los Angeles.
Oklahoma: 310 Thompson Bldg., Tulsa.

PERU—Oil Area



Available FOR EXPORT!

FLOATING EQUIPMENT

CEMENTING EQUIPMENT

MEASURING DEVICES & PARTS

CALIPER LOGGING EQUIPMENT

ELECTRIC LOGGING EQUIPMENT

FORMATION TESTING EQUIPMENT

. . . Time-Tested
HALLIBURTON *Equipment, Facilities and Materials*

• All of the specially developed equipment, facilities and materials used by Halliburton in rendering its program of services are available for sale or rental to operators in foreign fields where Halliburton does not operate as a service company.

For fast, effective contacts with operators, Halliburton maintains export facilities in

NEW YORK: 2412 Chase National Bank
20 Pine Street
New York 5, N. Y.

HOUSTON: 831 Esperson Building
Houston, Texas

LOS ANGELES: 1709 West 8th Street
Los Angeles 14, Calif.

CARACAS: Apartado 1969
Caracas, Venezuela

BOGOTA: Apartado Aereo 4549
Bogota, Colombia

Please feel free to call upon these offices or our main office for information and cooperation.

Halliburton OIL WELL CEMENTING CO. DUNCAN OKLAHOMA

NEW YORK • LOS ANGELES • HOUSTON, U. S. A. • CARACAS, VENEZUELA • BOGOTA, COLOMBIA

This company is conducting the only wildcat drilling in the country.

Sociedad de Petroleos Espana, with headquarters at Pirin, has properties in the region north of Lake Titicaca.

PRODUCTION

Peru has been listed in the world's producing columns since 1884, antedating all other countries in South America in that respect. It did not attain the 1000-barrels-per-day class, however, until 20 years later, and reached 10,000 barrels per day in 1921. For the past 30 years, production has varied from 30,000 to 45,000 barrels per day, always with a substantial exportable surplus. During 1945, production totaled 13,747,341 barrels, an average of about 37,665 barrels daily. This compares with a total output of 14,385,911 barrels in 1944, or a daily average of about 39,000 barrels.

In addition to crude production, Peru also has a large output of natural gasoline, usually blended with the crude to increase its gravity.

In former years a large percentage of Peru's surplus production, over and above domestic consuming requirements, was exported as crude to other countries in South and North America. Recently, the tendency has been to refine locally the entire output and confine exports to refined products.

WILDCAT DRILLING

All wildcat drilling in Peru during 1944 and 1945 was conducted by the Peruvian government with private interests focusing their drilling activity on proven fields.

During 1945, the Peruvian government started two wildcat tests in the old Pirin field area, Puno Province, northwest of Lake Titicaca. One of the tests blew out at about 868 feet and the hole was lost with operations abandoned in March. The second test was drilling below 600 feet at last report. Cable tools are being used.

The government also is starting a wildcat test on the Ucayali river, 125 miles north of Agua Caliente and only a short distance across the river from a location made by the Compania Petroleo de Oriente on a small concession almost surrounded by federal oil reserves.

REFINERIES

Peru has three refineries, two with small capacities, and a natural gasoline plant.

The largest refinery is operated by International Petroleum Company at Talara in Piura Province on the Pacific Coast. The plant has a crude charging capacity of 38,000 barrels daily with the average actual runs in 1944 being 37,331 barrels. The refinery has a cracking capacity of 6800 barrels daily. The company's natural gasoline output in 1944 totaled 920,865 barrels.

The Peruvian government has a 1000-barrel skimming plant at Zorritos with actual runs in 1944 being 926 barrels daily. Compania de Petroleo Ganso Azul has a small skimming plant at Agua Caliente and during 1944 the actual runs average only 135 barrels daily.

Lobitos Oilfields, Ltd., has a small gasoline plant in the Lobitos field which produced a total of 112,903 barrels of gasoline during 1944.

LODGING

Hotels

Lima: Gran Hotel Bolivar and Country Club (hotel).

* * *

The cooperation of A. Cabrera La Rosa, Cuerpo de Ingenieros de Minas y Petroleo, Ministerio da Fomento, Lima, and E. H. Clayton, vice president of Compania Petroleo Ganso Azul is gratefully acknowledged.

Peru Crude Oil Production by Companies
(In Barrels)

YEAR	International (Canadian) Fields[1]	Lobitos (British) Fields[2]	Peruvian Government Fields[3]	Ganso Azul United States Fields[4]	Total Peru
1935	14,796,914	2,259,966	49,675	.....	17,106,555
1936	15,126,490	2,417,557	49,102	.....	17,593,149
1937	14,722,753	2,695,948	39,214	.....	17,457,015
1938	13,137,988	2,660,022	40,000	.....	15,838,010
1939	10,806,881	2,651,282	49,350	.....	13,507,513
1940	9,626,831	2,431,477	67,957	.....	12,126,265
1941	10,362,395	1,507,208	53,221	13,750	11,936,574
1942	11,089,506	2,469,902	41,850	27,201	13,628,459
1943	12,055,908	2,529,232	39,766	29,592	14,654,498
1944	11,763,068	2,496,782	80,736	45,325	14,385,911
1945	11,278,382	2,263,506	137,065	68,388	13,747,341

[1] Includes La Brea-Parinas. [2] Includes Restin-El Alto. [3] Includes Zorritos and Los Organos. [4] Agua Caliente field.

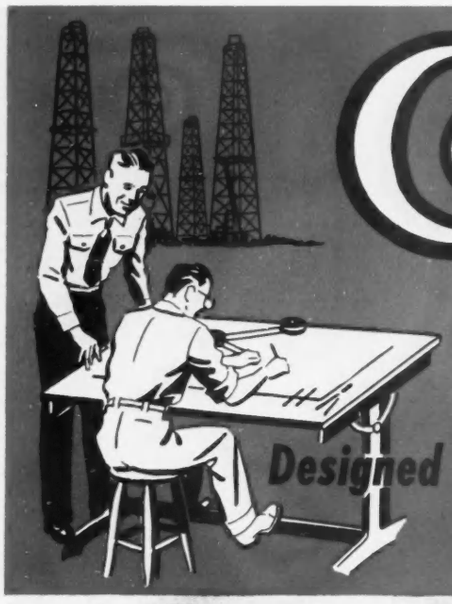
Refineries of Peru

Company, Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Establecimiento Industrail de Zorritos, Apt. 130, Calle Constitucion 25, Callao	Zorritos	1000	None	Skimming	Operating
International Pet. Co. Ltd., 56 Church St. Toronto, Sarnia, Ontario, Canada	Talara	38,000	6800	Skimming Cracking	Operating
Compania de Petroleo Ganso Azul, Ltd.	Aguas Calientes	500	None	Skimming	Operating

Field Completion and Drilling in Peru

FIELD	WELLS COMPLETED IN FIELDS IN 1944					WELLS COMPLETED IN FIELDS IN 1945					FIELDS WELLS DRILLING, RIGGING UP, AND SHUT DOWN AT END OF 1945			
				Total					Total					
	Oil	Gas	Dry	Wells	Footage	Oil	Gas	Dry	Wells	Footage	Dr.	RU	SD	Total
La Brea-Parinas, **Piura**	45	3	19	67	195,710	69	....	15	84	285,155	25	9	2	36
Lobitos, **Piura**	10	....	....	10	28,238	13	....	1	14	23,500	....	....	....	....
Restin-El Alto, **Piura**	30	....	....	30	35,873									
Pirin (Haucano), **Puno**	....	....	2	2	.....	....	....	....	....	.....	....	....	....	....
Agua Caliente, **Haunuco**	....	....	....	....	.....	....	....	....	....	.....	....	....	....	....
Los Organos or Constancia, **Piura** Zorritos, **Tumbes**	2	....	3	5	5,526	2	....	1	3	9,241	2	1	....	3
Total	87	3	24	114	265,347	84	....	17	101	317,896	....	....	....	....

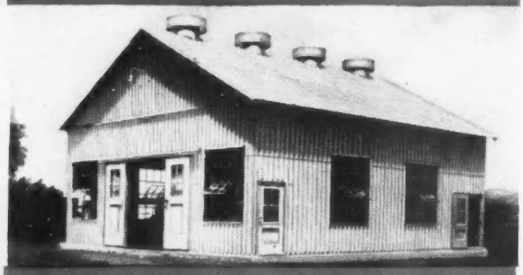
COLUMBIAN
OIL EQUIPMENT



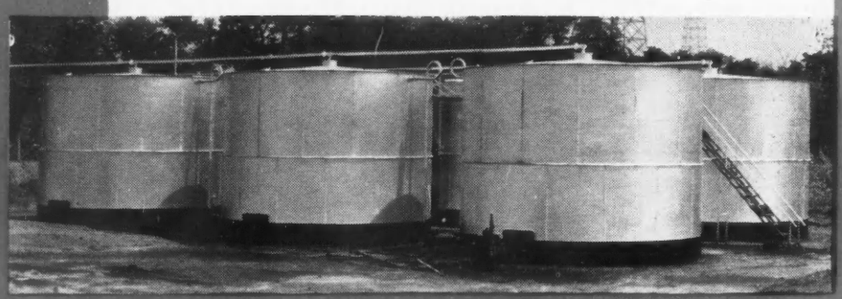
Designed and Built to the Oil Producers Liking!

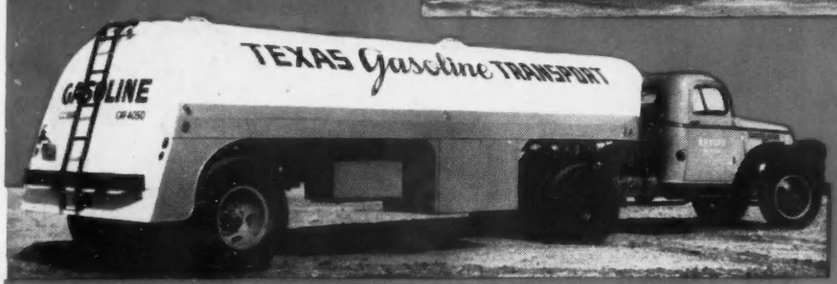
COLUMBIAN is internationally known as expert builders of an extensive variety of fabricated steel products that are precision engineered and quality built to meet the highest requirements of oil producers all over the world. For more than 50 years the name "**COLUMBIAN**" has been a reliable guide to oil equipment that is outstanding for dependability and low-cost service.

Besides the famous Columbian Oil Equipment shown here, Columbian also can supply you with Welded Steel Storage Tanks for above or underground storage, Pressure Vessels and many other items. Many of these products are designed to be shipped knocked down in sections that are easily put together by unskilled labor. For complete information write our Export Department, Alfred Unger.



METAL BUILDINGS of sectional panel construction — ideal for warehouses, engine houses, garages, equipment, storage, etc.





BOLTED STEEL TANKS — Columbian Bolted Steel Tanks are used the world over for safe, dependable, low-cost storage—giving an extra measure of protection and amazingly long service.

TRUCK TANKS & SEMI-TRAILERS— Gasoline transport units with many exclusive features of design and construction — more pay load—less dead weight.

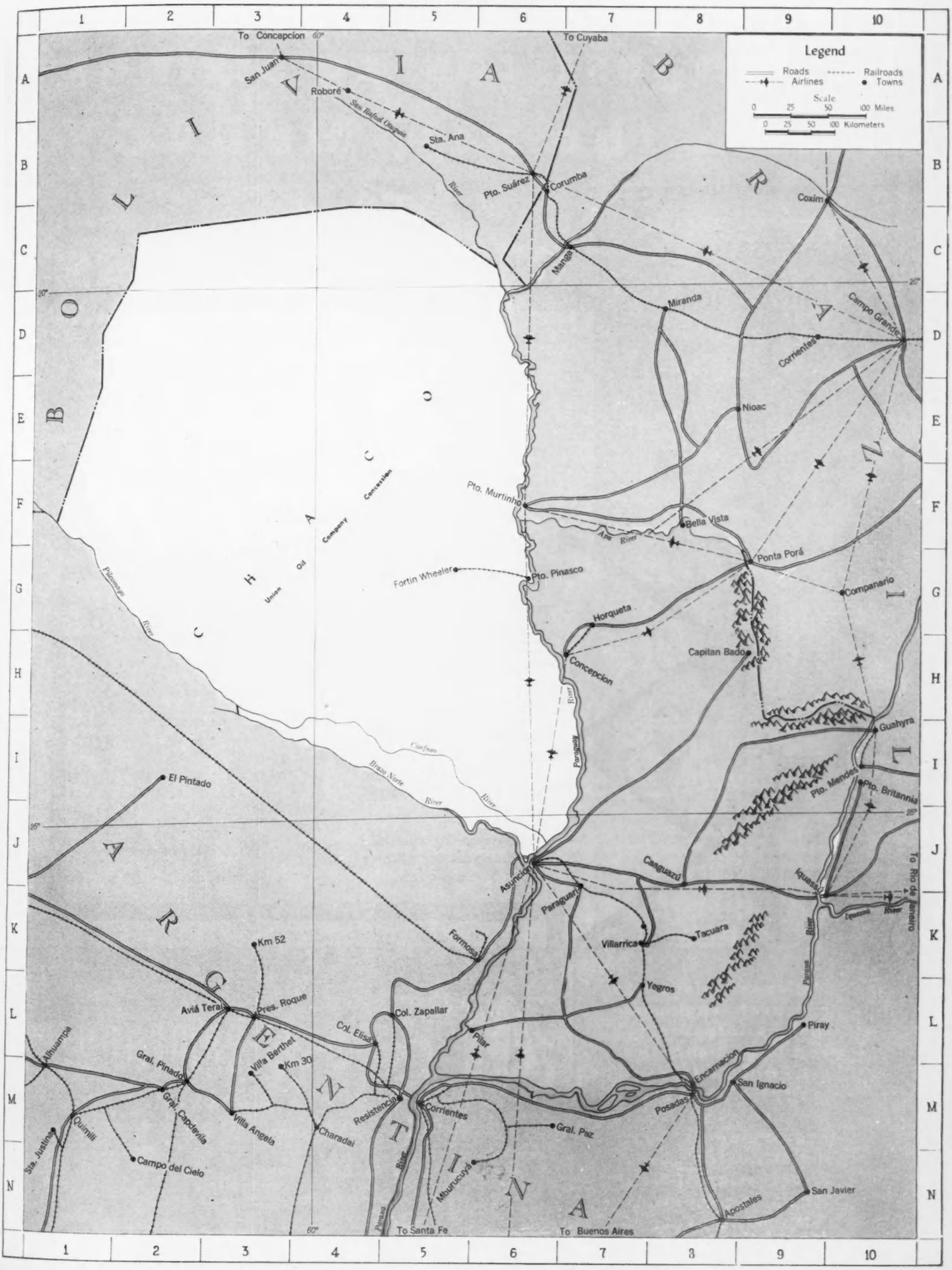
METAL SERVICE STATIONS with the big advantage of STEEL for lower upkeep, rugged strength, protection against fire, termites, and costly effects of rotting, warping, shrinking and splitting. Sizes and designs to meet your needs.

COLUMBIAN STEEL TANK COMPANY MANUFACTURERS TANKS FOR THE WORLD KANSAS CITY, MO. U.S.A.

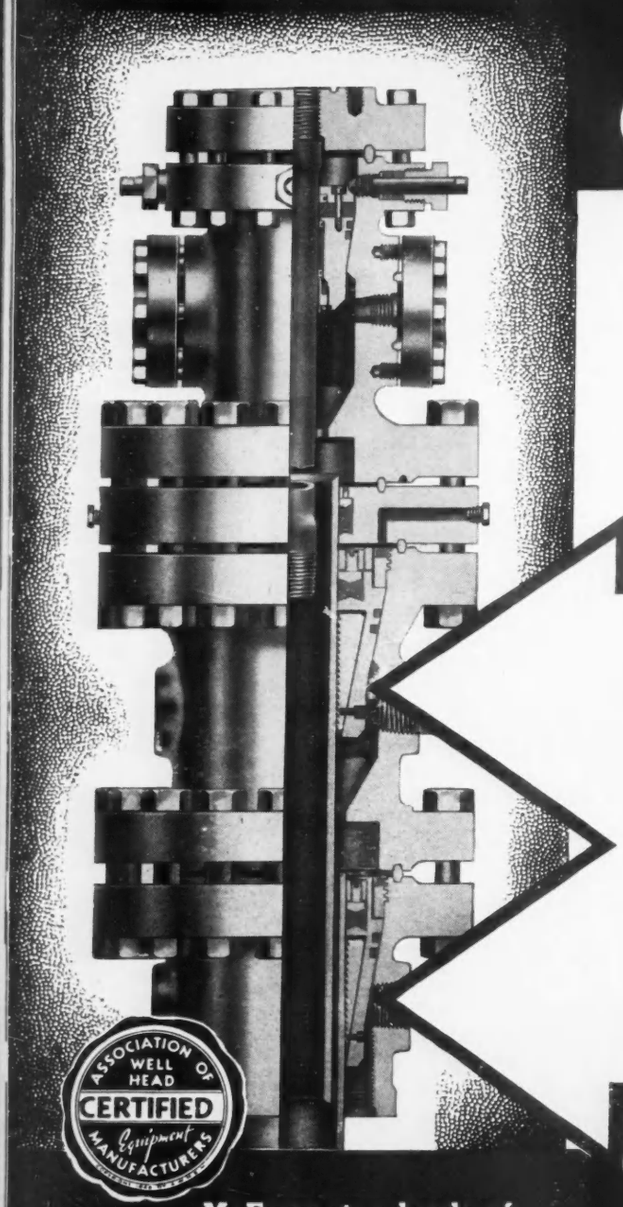
COLUMBIAN STEEL TANK CO. K.C. MO. COP-NIC COPPER-NICKEL ALLOY TANKS FOR THE WORLD

COLUMBIAN STEEL TANK CO., Kansas City, Mo., U.S.A.

PARAGUAY


Legend
Roads
Railroads
Airlines
Towns
Scale
0 25 50 100 Miles
0 25 50 100 Kilometers
BOLIVIA
BRAZIL
ARGENTINA
PARAGUAY
To Concepcion
To Cuyaba
San Juan
Roboré
San Rafael Otuquis
Sta. Ana
Pto. Suárez
Corumba
Manga
Coxim
Miranda
Campo Grande
Corrientes
Nioac
Pto. Murtinho
Bella Vista
Ponta Porá
Fortin Wheeler
Pto. Pinasco
Companario
Horqueta
Concepcion
Capitan Bado
Guahyra
Pto. Mendes
Pto. Britannia
El Pintado
Asuncion
Paraguari
Caaguazú
Iguassu
To Rio de Janeiro
Villarrica
Tacuara
Yegros
Formosa
Km 52
Aviá Terai
Pres. Roque
Col. Zapallar
Col. Elisa
Pilar
Piray
Encarnacion
San Ignacio
Posadas
Villa Berthet
Km 30
Resistencia
Corrientes
Gral. Paz
Gral. Pinedo
Gral. Capdevila
Villa Angela
Charadai
Quimili
Sta. Justina
Campo del Cielo
Mburucuyá
San Javier
Apostales
To Santa Fe
To Buenos Aires
Pilcomayo River
Paraguay River
Paraná River
Pasaje River
Iguassu River

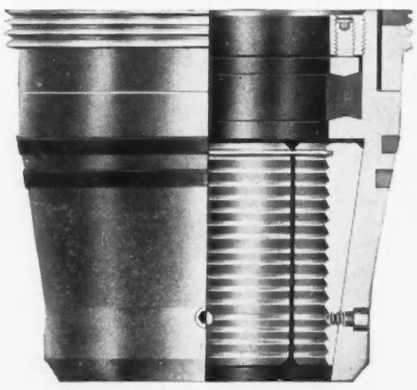
NO BOTTLENECKING
on longest casing strings with the new McEVOY
Type LHCS-2
CASING HANGERS



The new McEvoy Type LHCS-2 interchangeable Casing Hanger is especially designed to hold extremely long strings of casing. Danger of bottlenecking is eliminated because the weight of the pipe is distributed evenly over the large slip area which is backed up by a solid housing (not a split housing). Proved by hydraulic tests to have ample capacity to carry the longest strings of pipe being set in today's deepest wells. Proved, too, by field tests on many deep wells of leading companies.

The McEvoy LHCS-2 Casing Hanger is a simplified slip-pack type hanger, providing a positive seal without welding. Can be field assembled and tested before well completion. Carried in stock in all API casing sizes, and can be supplied in special sizes on order.

McEvoy casing and tubing hangers permit any type of completion.



LHCS-2

ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS CERTIFIED

McEvoy standards of research, engineering, manufacturing and inspection mean safe, trouble-free installations. McEvoy products meet API requirements and the standards of the Association of Well Head Equipment Manufacturers.

ARMY NAVY

McEvoy COMPANY

TEXAS AT MILBY ST. • P. O. BOX 3127

HOUSTON 1, TEXAS

EXPORT SALES

E. F. GAHAN, RM. 1223, 500 FIFTH AVE., NEW YORK 18, N. Y.

SOUTH AMERICAN FIELD REPRESENTATIVE

W. C. LANGLEY, BARRANQUILLA, COLOMBIA, S. A.

PARAGUAY

WILDCAT PROSPECTS

PARAGUAY, one of South America's non-oil producing nations, is in the midst of a serious oil exploration campaign with the first of a possible series of wildcat tests slated to be started by July 1.

This activity is a direct result of a contract signed in the latter part of 1944 between the government of Paraguay and Union Oil Company of California which followed the Paraguayan government's action in declaring the entire Gran Chaco region a reserved zone for petroleum prospecting in October, 1944.

The Republic of Paraguay is roughly divided by the Paraguay River, and the Chao Territory, with its 23 million hectares (about 57 million acres) representing approximately two thirds of the entire country, lies to the west of the river. The Chaco, once claimed by Bolivia, is a low lying area covered by scrub growth, largely undeveloped, and sparsely inhabited.

For comparative purposes, if the area to be prospected were superimposed on the map of California, it would extend from south of Los Angeles to about 250 miles north of San Francisco, and from the state line of the east, 100 miles out into the Pacific Ocean on the west.

UNUSUAL CONTRACT

The government order making the whole of the Chaco Territory a national oil reservation also authorized the Ministry of Public Works and Communications to contract Union Oil Company for prospecting, investigating and exploiting for oil.

Unlike most other deals between oil companies and South American nations, the agreement between Union and the Paraguayan government is a contract and not a concession. As the contractor for the government, Union supplies the geological and geophysical talent; will find and develop the oil fields if there are any; and will provide the necessary oil experience in drilling, transportation, refining and marketing.

The original document signed by Union and Paraguay actually forms the basis for future specific and complete contracts. The over-all agreement grants the company exploratory privilege for the entire Chaco for a period of 10 years. Union pays a surface prospecting tax of 1.1 centimo on the 23 million hectares ($83,333.33) affected by the agreement during the first year with an increase of 0.1 centimo annually, paying 1.9 centimos at the tenth year. When any acreage is dropped the surface tax payments on that acreage stops.

Union has the right to select exploratory blocks "Pertenencias" with no limit to the number selected and which can be held for a period of four years with no provision for extension. The blocks consist of 10,000 hectares (24,710 acres) each with drilling operations to start within 18 months on each block and continue until oil is discovered or the block is released. Once a block is released it cannot be reacquired.

In case of an oil discovery an exploitation block can be selected around the discovery well. One or more blocks of 2000 hectares (4942 acres) each can be selected on the same structure. These blocks can be held for a period of 35 years with the privilege of a 15-year extension but in no case longer than 60 years from the date of the signing of the original decree.

Nonfulfillment of the obligations results only in losing the block in question while fulfillment of the obligations on one block does not apply on obligations on other blocks.

The contract grants the oil company a minimum of 85 percent of the oil produced with all expenses being paid by the company. A method of establishing the price of oil also is provided in contract.

In the event oil is discovered, Union has the right to construct refineries, install pipe lines and make other installations.

Following conclusion of the agreement, Union immediately sent geophysical crews and equipment into the Chaco and actual drilling will begin not later than July 1, 1946.

Because no wells have ever been drilled in the area, nor any outcrops found, the company faces many unusual problems in its forthcoming drilling campaign. The actual drilling will necessarily be dependent on the seismograph to map structures and to draw some inference concerning the thickness of the sedimentary section and other geologican information.

DRILLING HANDICAPS

The Chaco is heavily wooded with no practical roads. In order to move a rig in to the first location, the company will have to ship the material up the Paraguay River for several hundred miles, then over a small logging railroad for another 100 miles and finally improve the trails cut for transporting the geophysical equipment.

Because there is no geological section available anywhere within the area, several wells may be required to determine all the controlling factors on a single structure.

A glance at the map of South America will show that the Chaco of Paraguay is at least a geographical extension of the Argentine Chaco, the site of known geophysical structures, while the oil districts of Bolivia are adjacent to the Paraguayan frontier on the northwest.

Practically everything needed will have to be brought in from Asuncion, the capital. The water supply, both for drinking purposes and for operations, will be provided by sinking water wells at camp locations. Buildings are being constructed near the center of the area. These will serve as headquarters for the operations as well as providing housing facilities for the personnel. Complete auxiliary units must be built from time to time as operations are extended deeper into the interior and away from the main camp.

FIRST TEST SLATED

Union Company now is expanding its geophysical exploration in the Chaco territory and is preparing to drill the first test well in the western part of the area. A second geophysical party recently organized will increase the tempo of this phase of the work, while the drilling of the exploratory well will furnish needed geological information.

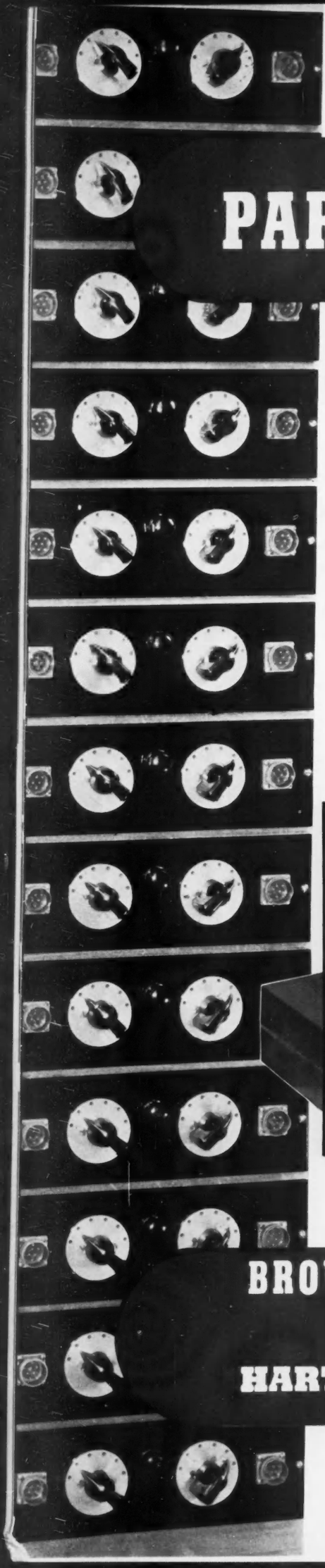
Initial shipments of transportation, road-working and construction equipment have been delivered to the Chaco and most of the equipment for the drilling operation is en route to Paraguay. Actual drilling will start before July 1.

The long line of communication involves the use of marine transportation from California, Gulf and East Coast ports to Buenos Aires and Montevideo where cargo is transshipped by river boats, barges, rail and trucks to the location.

CLIMATE

The climate of the country is subtropical. During the summer, from December to March, the average temperature during the day is about 90 degrees Fahrenheit, and at times temperatures range as high as 110 degrees Fahrenheit in Asuncion, the capital. The winter season, from May to September, occasionally brings near freezing temperatures although the average for July has been recorded at 66 degrees Fahrenheit.

Rainfall records in Asuncion show averages of 37 to 55 inches annually and 1 to 7 inches per month. The drier season corresponds to the cool months (May-October).



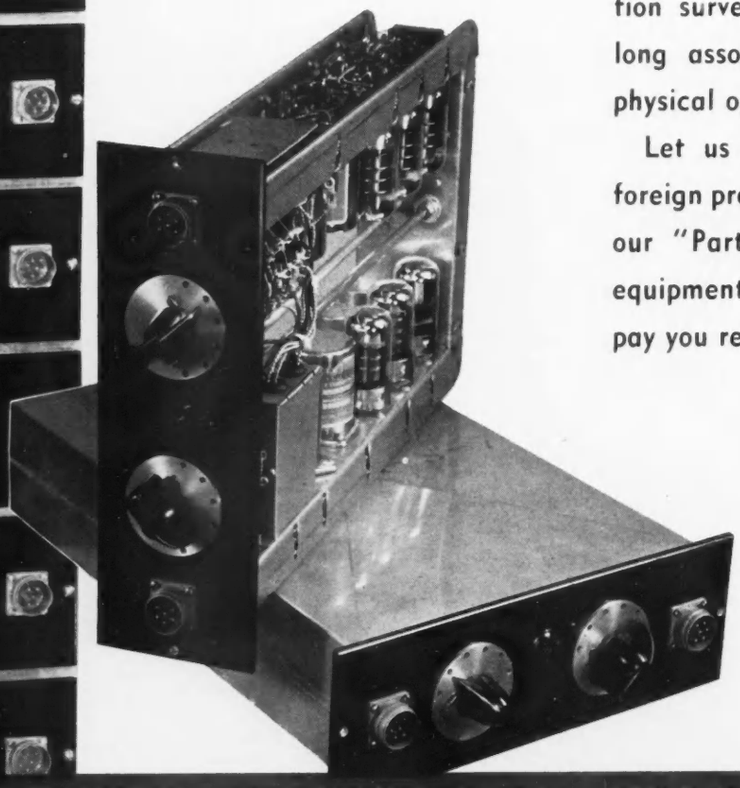
PARTNERS IN ACCURACY

MODERN EQUIPMENT . . . EXPERIENCED CREWS

We have combined these two prerequisites for successful geophysical exploration ... experience and modern equipment ... into a close-working "partnership," designed for thorough, accurate seismograph surveys.

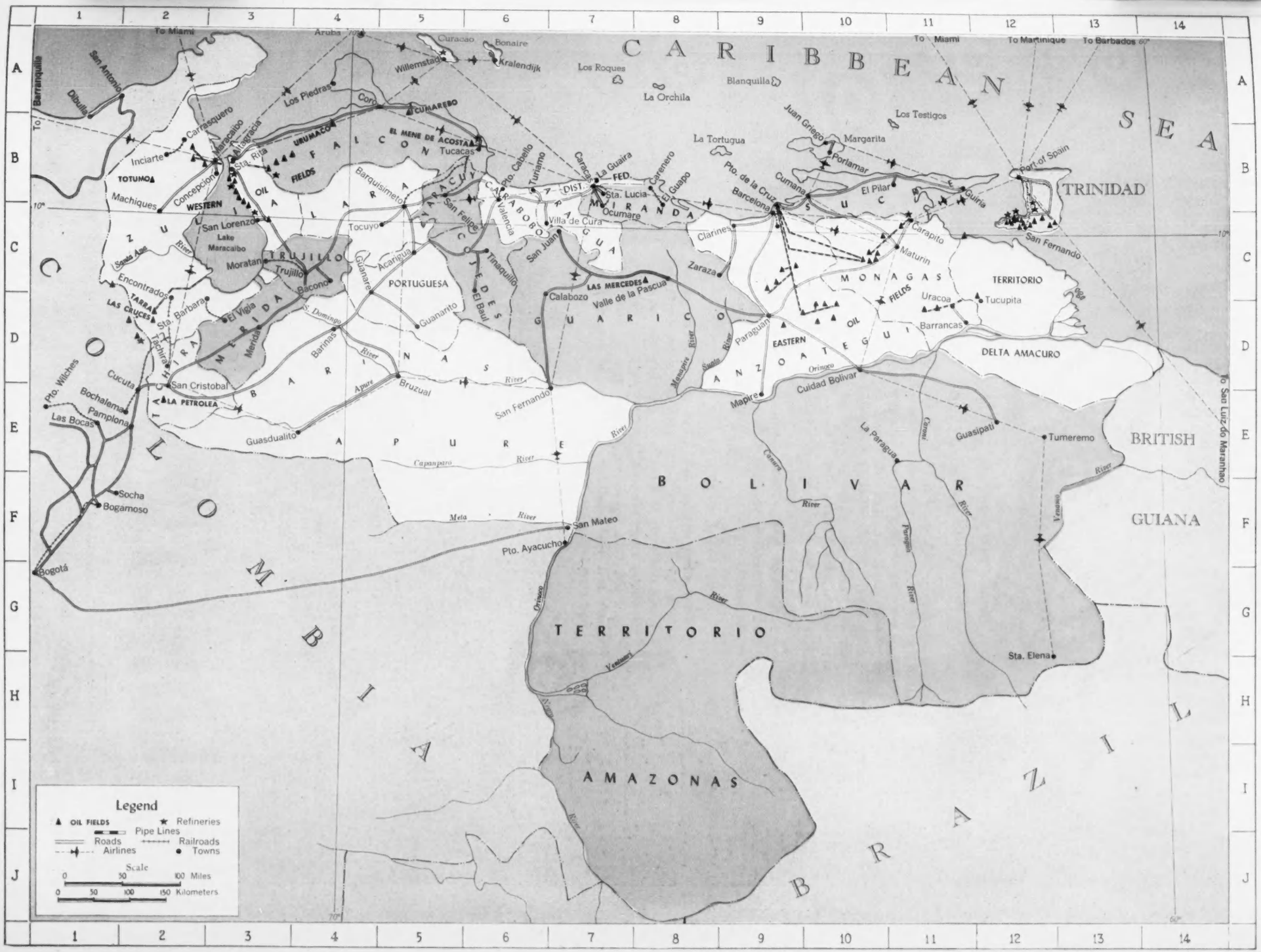
In the present design of our instruments, we have taken full advantage of wartime developments in the electronic field. Our flexible instruments are unitized and water-proofed ... adaptable for transport or pack in today's *and tomorrow's* new areas of interest. Our crews ... all thoroughly experienced in reflection and refraction surveys ... are headed by men long associated with leading geophysical operations.

Let us discuss your domestic or foreign problems. Results achieved by our "Partners in Accuracy" ... fine equipment and skilled crews ... will pay you real dividends.



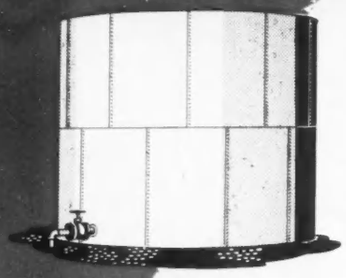
BROWN GEOPHYSICAL COMPANY
And GEOPHYSICAL ASSOCIATES
GRAVITY-SEISMIC

HART BROWN **E. JOE SHIMEK**
BOX 6005 **HOUSTON 1, TEXAS**


CARIBBEAN SEA
COLOMBIA
BRAZIL
BRITISH GUIANA
TRINIDAD
Aruba
Curacao
Bonaire
Willemstad
Kralendijk
Los Roques
La Orchila
Blanquilla
La Tortugua
Los Testigos
Margarita
Juan Griego
Portlamar
Port of Spain
To Miami
To Martinique
To Barbados
To Barranquilla
San Antonio
Dibulla
Los Piedras
Coro
CUMAREBO
EL MENE DE ACOSTA
Tucacas
URUMACO
FIELDS
FALCON
Carrasquero
Maracaibo
Maracaibo
Sta. Rita
Inciarte
TOTUMO
Machiques
Concepcion
WESTERN
OIL
FIELDS
ZULIA
Lake Maracaibo
San Lorenzo
Moratan
TRUJILLO
Trujillo
Bacono
Santa Ana River
Encontrados
TARRA
LAS CRUCES
Sta. Barbara
El Vigia
MERIDA
Merida
Tachira
TACHIRA
San Cristobal
LA PETROLEA
Pto. Wilches
Cucuta
Bochalema
Pamplona
Las Bocas
Socha
Bogamoso
Bogotá
Barquisimeto
Tocuyo
Guanare
Acarigua
PORTUGUESA
Guanarito
Barinas
S. Domingo River
Barinas
Apure River
Bruzual
Guasdualito
Capanparo River
Mela River
San Fernando
San Mateo
Pto. Ayacucho
Orinoco River
Ventuari River
Atabapo River
Casiquiare River
Negro River
Paragua River
Caroni River
Venamo River
TERRITORIO
AMAZONAS
BOLIVAR
DELTA AMACURO
EASTERN
OIL
FIELDS
ANZOATEGUI
Pto. Cabello
Turiamo
Caracas
La Guaira
FED. DIST.
Sta. Lucia
Ocumare
El Guapo
Carenero
MIRANDA
Valencia
CARABOBO
Villa de Cura
San Juan
GUARICO
San Felipe
YARACUY
Tinaquillo
El Baul
LAS MERCEDES
Calabozo
Valle de la Pascua
Zaraza
Clarines
Pto. de la Cruz
Barcelona
Cumana
SUCRE
El Pilar
Guiria
Carapito
Maturin
MONAGAS
TERRITORIO
Uracoa
Tucupita
Barrancas
Paraguana
Mapire
Ciudad Bolivar
Guasipati
Tumeremo
La Paragua
Sta. Elena
San Fernando
To San Luiz do Maranhao
Legend
OIL FIELDS
Refineries
Pipe Lines
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 150 Kilometers

MALONEY CRAWFORD

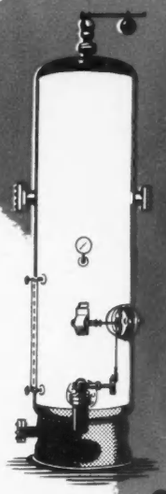
Superior Products



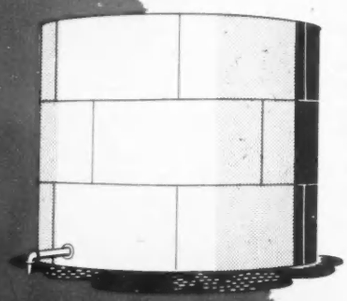
BOLTED STEEL TANKS

Maloney-Crawford is the *only tank manufacturer* which oven-heats its bolted steel tank plates to 700° F. to remove oil or water film and foreign matter before painting with two coats, primer and aluminum containing war-developed rust inhibitor. Another reason why Maloney-Crawford Tanks last longer.

Maloney-Crawford Oil and Gas Separators embody improvements in design, construction and separation; fully meeting API and ASME Code requirements. New interior design and mist extractor element assure highest percentage of dry gas when operating within the rated capacities of the various type separators.



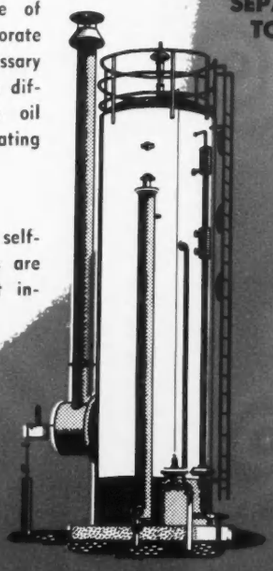
OIL AND GAS SEPARATORS



WELDED STEEL TANKS

Only the best materials and workmanship go into our welded steel tanks. All seams are electric welded in accordance with Code procedures. Each tank must also pass rigid plant inspections.

The new improved line of emulsion treaters incorporate the basic principles necessary for continuously treating different types of crude oil emulsions at low operating cost.



EMULSION TREATERS

Maloney-Crawford cantilever-type, self-supporting Stairways and Walkways are rigid, dependable and durable, yet involve only a minimum of weight.

STAIRWAYS AND WALKWAYS

STOCKS AND SERVICE AVAILABLE AT FOLLOWING PRINCIPAL OIL CENTERS:

Artesia, New Mexico; Odessa, Pampa, Seagraves, Houston and Corpus Christi, Texas; Delhi, New Orleans and Lafayette, Louisiana; Natchez, Jackson and Laurel, Mississippi; Tulsa, Okla.; Casper, Wyoming; Cutbank, Montana.

MALONEY CRAWFORD

BOX 659 (Successor to MALONEY TANK MFG. COMPANY) **TULSA**

VENEZUELA

PRODUCTION

DESPITE the heavy drain of the war years on Venezuela's reserves, the country should be able to maintain its position as the second largest producing country in the world for some time. Through careful field development and a restricted, but efficient program of exploration, it has met its requirements, apparently without appreciable harm to reserves. Up to the end of 1945 Venezuela had produced 3,220,308,965 barrels of oil, the greater portion of which came from the older, established Lake basin of the country's Western district.

The greater portion of the oil comes from the Western district which includes the older, established Lake Maracaibo basin as well as several fields west of the lake and smaller fields east and northeast. It is in this area (states of Zulia and Falcon) that the new Cretaceous production has been developed which should boost the potential substantially.

Eastern district production is situated almost entirely in the states of Monagas and Anzoategui, with a little in the extreme Federal Territory of Delta Amacuro.

Discovery by The Texas Company and affiliates of fields at Las Mercedes in Guarico, coupled with a Texaco-Creole Petroleum Corporation program of exploration indicate possibility of a third, Central district. There are several good prospects in the area and early drilling is scheduled.

Production reached an all-time peak in 1945 at 323,358,300 barrels with highest production set by November's daily average of 1,001,850 barrels. The year-round average was 885,900 barrels daily, which compares with a daily average of 702,229 barrels in 1944. Production rates for Venezuela should not show a pronounced drop for several years to come.

DRILLING

Drilling during 1945 reflected the war influence, in that it was largely confined to known producing areas—where the expenditure of critical materials might be expected to yield an adequate return in oil. This is shown in completion of only 33 dry holes out of the 520 wells drilled during the year. Only 15 wildcats were drilled. Four were in Western and 11 were in Eastern Venezuela. Three of these opened fields. Well completions reflected a 39 percent increase over 1944.

Drilling prospcts for 1946 are promising, with a great increase expected in wildcatting. Ending of the emergency on production will release rigs for exploratory work, far behind schedule, and new drilling equipment is becoming more readily available. At the close of 1945 there were more than 90 rigs operating in the entire nation, of which about a third are in Western Venezuela, with the greater part of the drilling to come in the Eastern district.

REFINERIES

Venezuela has a current total refining capacity of 108,900 barrels daily divided about equally between the Eastern and Western dsitricts, but under the 1943 oil law the operators are required to refine at least 10 percent of their crude within the country, and a building program is planned which will result in an additional 140,000 barrels capacity.

Creole Petroleum Corporation operates at Caripito in Eastern Venezuela with a capacity of 55,000 barrels daily, of which 35,000 barrels is cracking. A new 40,000-barrel plant is planned immediately, not to be at Turiamo as originally thought, but perhaps on Paraguana Peninsula. The company's 12,000-barrel skimming plant at La Salina on Lake Maracaibo, is operating at capacity.

Caribbean Petroleum Company (Shell group) operates a 37,800 barrel plant at San Lorenzo on Lake Maracaibo with no cracking capacity. *Colon Development Company* has three small plants in Western Venezuela: a 700-barrel plant at Casigua, and 200-barrel plants at Rivera and at El Calvario. Shell is now building a complete 40,000-barrel refinery at Punta Cardon on Paraguana Peninsula.

Socony-Vacuum Oil Company operates a small plant at Guario in Eastern Venezuela, capacity 120 barrels.

Mene Grande Oil Company operates an 1800-barrel refinery at Cabimas, and also an 830-barrel plant at Oficina. A 20,000-barrel plant with complete cracking facilities will be constructed at Puerto la Cruz.

Consolidated Oil Corporation (Sinclair interest) will build a complete 40,000-barrel plant at Puerto la Cruz near its present export terminal.

British Controlled Oil Fields, Ltd., operates a 250-barrel refinery at El Mene, northeast of Lake Maracaibo.

TRAVEL FACILITIES

Main Airlines are shown on the maps. Frequent flights may be had via Pan American Airways into Caracas and other north coast points, and along the north coast between Maracaibo, Caracas (Maiquetia airport at La Guaira), Barcelona, and Maturin, continuing to Port of Spain, Trinidad, and to points in Colombia. Service along the coast and to points in interior via Avensa, a PAA affiliate. Avensa goes to airports near fields at San Joaquin, San Tome, and Caripito. Other points in interior served by Linea Aeropostal Venzolanas. Service between Miami, Caracas, Port of Spain, Aruba, and Curacao, by Dutch KLM lines. Taca airlines recently extended its service from Mexico and Central America.

Railroads are comparatively few.

Highways have been completed by companies so that rapid travel is possible between Barcelona, Puerto la Cruz, and all fields in Eastern Venezuela with exception of Temblador area. Transportation to some fields and camps can be arranged in company planes or cars through officials in New York or Caracas.

LODGING

Caracas: Hotel Avila, Veroes Apartments, Hotel Majestic, Club Americano, Hotel Cervantes, Hotel Guimera, Gran Hotel Americano.

Puerto de la Cruz: Mene Grande Oil Company guesthouses.

Maracaibo: Hotel Scandia, Creole Petroleum Corporation, Caribbean Petroleum Company, or Mene Grande Oil Company camps.

Northern Monagas Area: Maturin, Hotel Espana, Hotel Nuevo Mundo; Caripito, Creole Petroleum Company camp; Jusepin Area, Creole Petroleum Company camp; Santa Barbara, Compania Consolidada camp.

Anzoategui Area: San Joaquin-Anaco area: Creole or Socony-Vacuum camps; Oficina area: Mene Grande Oil Company camp at San Tome.

Lake Basin Area: Creole Petroleum Company, Caribbean Petroleum Company, or Mene Grande Oil Company camps.

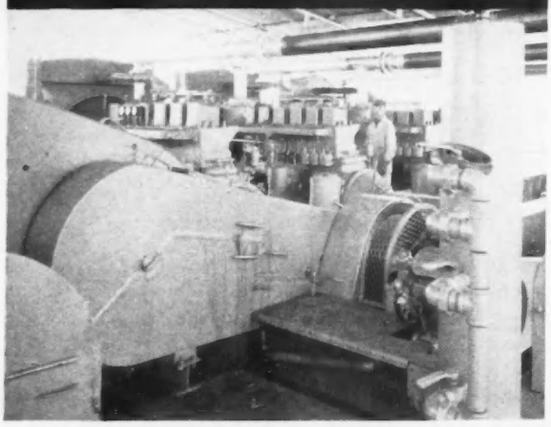
Note: Facilities at company camps may be used only on arrangement with company officials in New York or Caracas.

Venezuela Crude Production—(In Barrels)

	WESTERN DISTRICT		EASTERN DISTRICT		ALL VENEZUELA	
	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average
1940	137,759,571	376,392	48,694,610	133,046	186,454,181	509,438
1941	165,493,292	453,406	62,079,062	170,080	227,572,354	623,486
1942	106,536,286	291,880	40,972,094	112,253	147,508,380	404,133
1943	144,832,532	396,801	34,540,363	94,631	179,832,895	492,693
1944	183,180,705	500,494	73,835,234	201,735	257,015,939	702,229
1945	218,345,273	598,206	105,013,058	287,707	323,358,331	885,913

WAUKESHA
OIL FIELD POWER

DRILLING



PUMPING

SERVICING

WAUKESHA OIL FIELD NATURAL GAS POWER UNITS

Model of Engine	No. of Cyls.	Bore & Stroke In.	Displ. Cu. In.	Max. Rated Hp.	Max. Rated Rpm.
6-LROU	6	8½x8½	2894	409	1050
6-NKU	6	7 x8½	1962	225	1050
6-WAKU	6	6¼x6½	1197	210	1600
145-GKU	6	5¼x6	779	150	1800
140-GKU	6	4½x5½	525	111	1800
6-SRKRU	6	4⅝x5⅛	517	91	2000
6-MZAU	6	4¼x4¼	404	86	2200
6-BZU	6	4 x4¼	320	69	2500
VIKU	4	4½x5¼	334	52	1500
XAHU	4	3⅝x4½	186	36	2200
FCU	4	3¼x4	133	27	2400
ICKU	4	2½x3⅛	61	16	2400

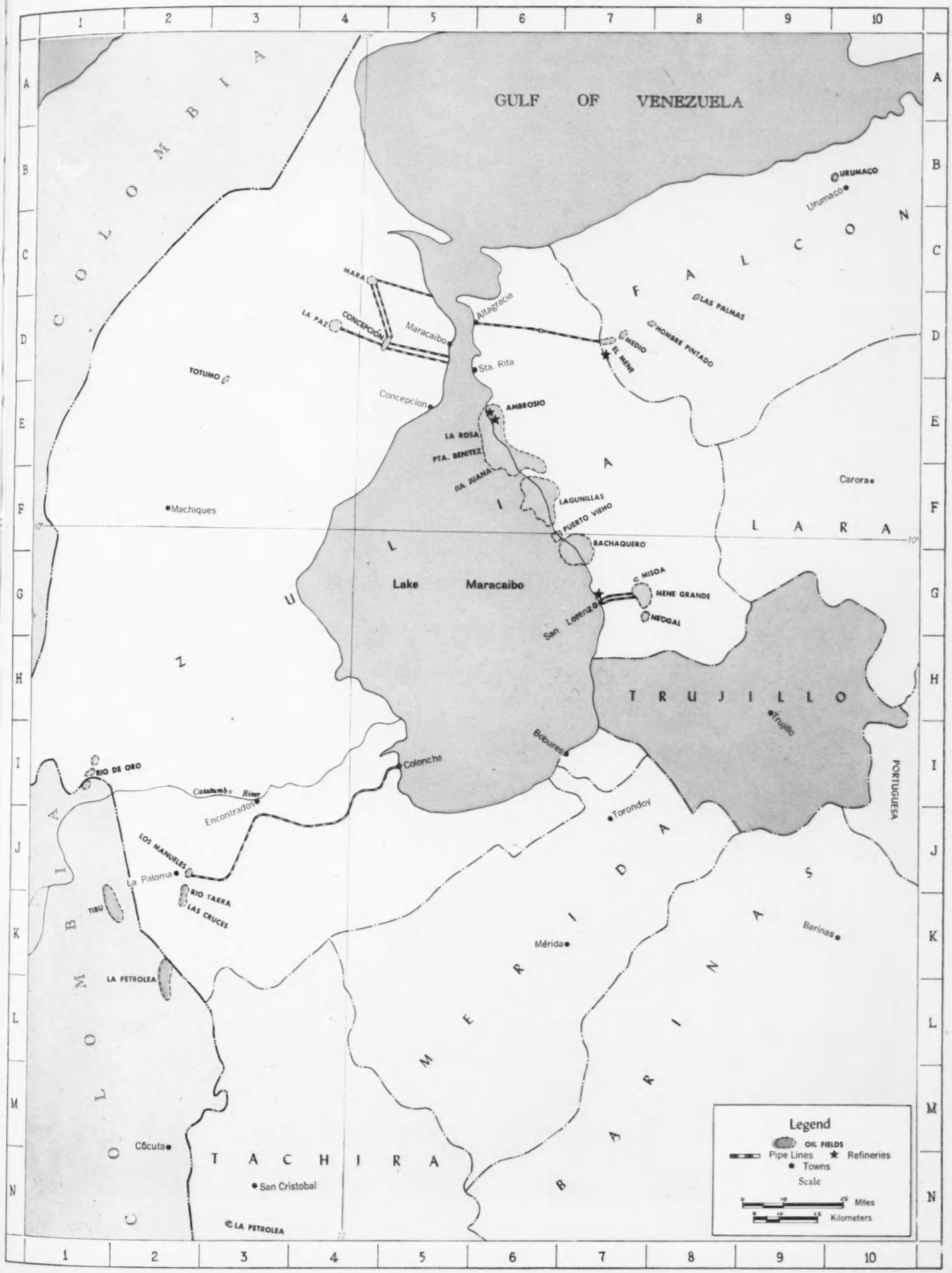
A long step ahead—in every detail of design and construction—today's Waukesha Oil Field Power Units combine versatility and dependability with full power capacity. And they can deliver that maximum power, fueled with your own product—natural gas—giving you smooth, grief-free operation with both fuel and lubricant economy.

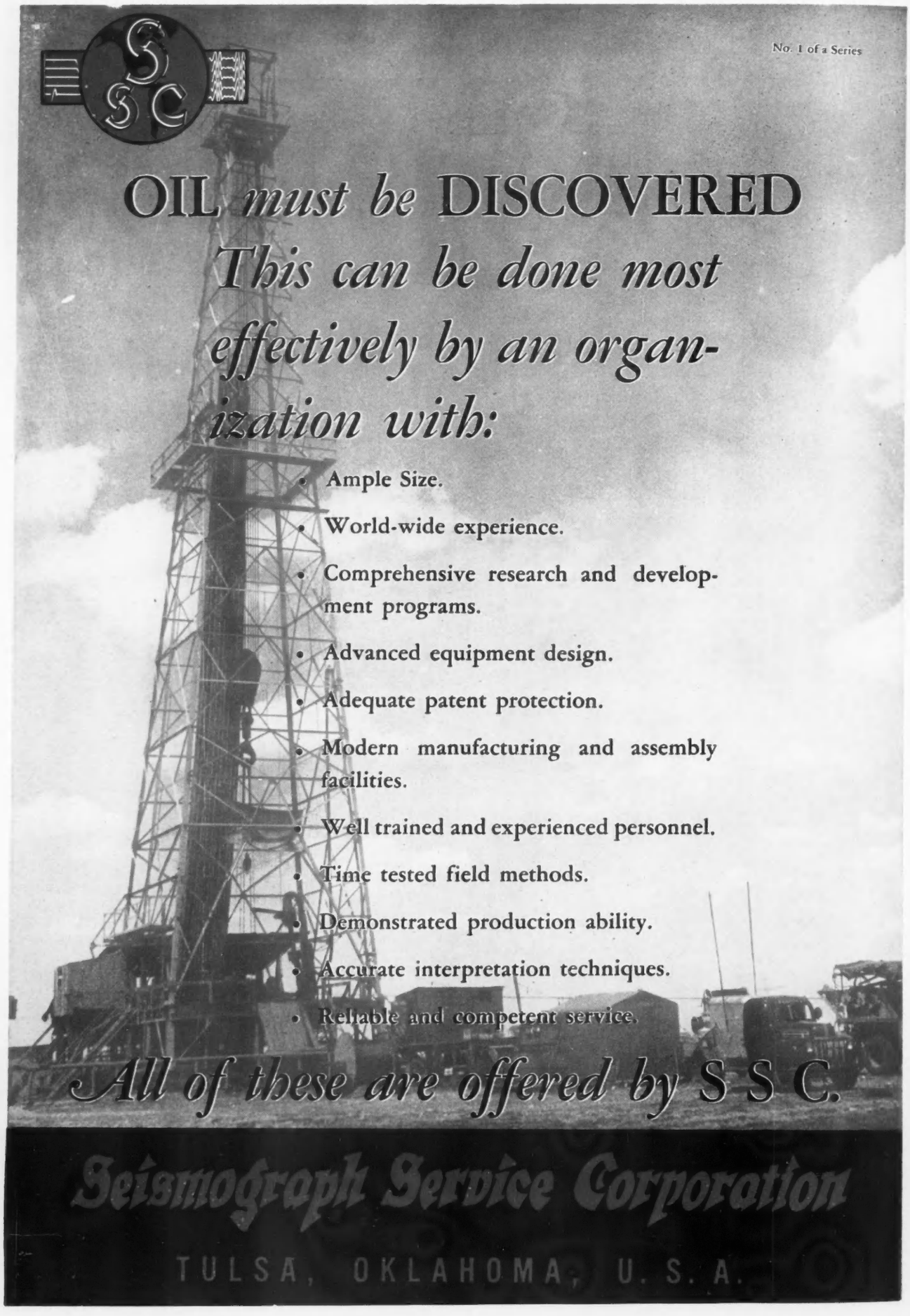
Wartime demands for Waukesha Oil Field Power Units not only accelerated the development of new designs . . . Waukesha ruggedness, and ability to carry the extra load hour after hour, were rigorously tested. Operators were patriotically pushing production to new peaks . . . Waukesha oil field engines, powering the heavier rigs, enabled them to drill deeper and faster. Waukesha's wider adaptability in drilling operations opened new production fields from Texas to the Atlantic seaboard. In pumping and servicing, too, Waukesha performance proved equally outstanding.

Waukesha pioneered multiple cylinder gasoline engines in the oil field. Forty years specialized *know how* in building heavy-duty internal combustion engines exclusively *keeps* Waukesha engines *out in front* . . . meeting the changing needs of the petroleum industry. Consult Waukesha engineers on all your engine needs. *Get Bulletin 1079.*

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS., NEW YORK · TULSA · LOS ANGELES

VENEZUELA—Western Area




No. 1 of a Series
OIL must be DISCOVERED
This can be done most effectively by an organization with:
• Ample Size.
• World-wide experience.
• Comprehensive research and development programs.
• Advanced equipment design.
• Adequate patent protection.
• Modern manufacturing and assembly facilities.
• Well trained and experienced personnel.
• Time tested field methods.
• Demonstrated production ability.
• Accurate interpretation techniques.
• Reliable and competent service.
All of these are offered by S S C.
Seismograph Service Corporation
TULSA, OKLAHOMA, U. S. A.

VENEZUELA—Western Area

EXPLORATORY DRILLING

CARIBBEAN Petroleum's DM-2 discovered the Mara field north of La Concepcion, 6011 feet, cretaceous formation, 2000 barrels 30-gravity oil daily through 5/8-inch choke which produced 1,140,460 barrels since it went on production in March, 1945. Cretaceous production was opened at La Paz in the same vicinity in mid-1944. West Venezuela had three dry wildcats in 1945 including VOC's R-801 in the Cabimas area, suspended at 13,033 feet for want of heavier equipment.

PIPE LINES

Although there are 210 miles of pipe lines in the Western Venezuela district, much of it is actually considered as part of the gathering systems for the large producing areas on the east side of Lake Maracaibo.

Longest trunk line in the area is *Colon Development Company's* 86-mile, 6-inch line from the Las Manueles-El Cubo area to Coloncha on Lake Maracaibo.

Other lines include: *Caribbean Petroleum Company's* two 10-mile, 8-inch lines from Mene Grande field to the San Lorenzo refinery.

Venezuelan Oil Concessions' 11-mile, 8-inch line from La Paz to La Concepcion, and a 15½-mile double 6-inch and 8-inch line from there to the Lake Maracaibo terminal at Punta Piedras.

British Controlled Oilfields, Ltd., 32½ miles of 6-inch from El Mene de Mauroa to La Estacada port.

Drilling in West Venezuela

Field, Province	Wells Completed in Fields in 1945				Field Wells Drilling, Rigging Up, and Shut Down at End of 1945		
			Total				
	Oil	Dry	Wells	Footage	Dr	SD	Total
Cabimas, Zulia	7	..	7	37,177	2	1	3
Tia Juana, Zulia	10	..	10	51,675	..	..	..
Lagunillas, Zulia	40	..	40	223,795	5	..	5
Bachaquero, Zulia	24	1	25	90,375	2	..	2
Pueblo Viejo, Zulia	7	2	9	28,372	3	..	3
Cumarebo, Falcon	2	..	2	4,512	..	..	..
La Paz, Zulia	5	..	5	21,028	4	..	4
Mene Grande, Zulia	8	2	10	61,708	2	..	2
Tarra-El Cubo, Zulia	19	3	22	43,225	2	..	2
Netick, Zulia	..	..	..	10,194	1	..	1
Hombre Pintado, Falcon	1	..	1	1,984	..	..	..
Mara, Zulia	1	..	1	5,955	2	..	2

Oil Wells and Crude Production of West Venezuela

*Field, State	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)			
		Shut in	Producing			Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
			Flowing	Art. Lift	Total Producing				
Zulia									
Cabimas	1917	..	114	810	924	66,000	28,513,000	25,676,633	504,864,622
Tia Juana	1928	..	194	318	512	144,000	40,960,582	48,893,503	364,687,316
Lagunillas	1926	..	127	1,030	1,157	283,750	79,652,912	97,085,806	1,292,806,832*
Mara	1945	..	1	....	1	6,000	.....	1,140,460	1,140,460
Bachaquero	1938	..	134	3	137	40,900	7,640,806	13,604,273	35,227,379
Pto. Viejo	1940	7	10	....	10	6,350	81,119	1,600,116	1,894,654
La Paz	1922	..	19	39	58	26,600	3,642,330	8,048,987	19,320,676
Mene Grande	1913	..	12	258	270	35,910	11,701,568	12,831,023	281,053,583
Netick	1943	..	2	....	2	300	18,725	146,034	327,342
La Concepcion	1925	..	3	91	94	3,380	1,357,769	1,355,097	28,965,651
Los Manueles	1927	..	43	71	104	4,790	3,088,389	1,933,271	35,650,149
El Culio-Tarra						12,330	3,988,636	3,873,340	58,667,009
Falcon									
Cumerabo	....	..	17	38	55	4,950	2,095,751	1,884,934	34,394,747
Hombre Pintado	1929	..	....	22	22	687	289,295	242,225	3,651,924

* Forty percent of Venezuela's cumulative production comes from Lagunillas.

Engineering and Geological Data on West Venezuela Fields

Fields, by States	Location on Map Page 159	Proved Area (Acres)	Probable Enlargement	Gravity of Oil (API)	PRODUCING FORMATION						
					Name	Kind	Age	Depth of Wells (Ft.)		Average Thickness of Pay (Feet)	Type Structure
								Minimum to Top of Pay	Maximum Total Depth of Wells		
Estado Falcon											
Cumarebo	[1]	540	....	49	Socorro	Lent. Sand	Miocene	1950	3000	30	Anticline
El Mene	D-7	1008	....	33	Agua Clara	Sandstone	Miocene	1120	1600	50	Anticline
Media	D-7	62	....	34	Agua Clara	Sandstone	Miocene	3280	3900	50	Fault
Hombre Pintado	D-7	92	....	24	Agua Clara	Sandstone	Miocene	2460	2630	60	Anticline
Las Palmas	D-8	50	....	34	Monte Claro	Sanstone	Oligocene	2750	....	55	Anticline
Estado Zulia											
Dto. Bolivar (Creole)	....	95249	....	16–30	La Rosa, Lagunillas y Bachaquero	Clay Sand	Mio-olieocène	....	....	17–150	Monocline
Cabimas (VOC)	....	13190	....	22	La Rosa y Lagunillas	Clay Sand	Mio-olieocene	2200	3600	85	Monocline Anticline
Cabimas (MGO)	....	2471	780	15–27	Lagunillas Icotea	Clay Sand	Mio-oliecoene	1600	3600	15–100	Monocline
Lagunillas (VOC)	F-6	18920	1160	16	Lagunillas Icotea	Clay Sand	Mio-oliecoene	2500	4000	66	Monocline
Lagunillas (MGO)	F-6	2717	638	11–18	Lagunillas Icotea	Clay Sand	Mio-oliecoene	2500	4000	14–144	Monocline
Bachaquero (VOC)	F, G-7	1391	....	14	Lagunillas Icotea	Clay Sand	Mio-oliecoene	2800	6000	98–215	Monocline
Bachaquero (MGO)	F, G-7	1246	549	13–17	Lagunillas Icotea	Clay Sand	Mio-oliecoene	2800	6000	13–110	Monocline
Mene Grande (CPC)	G-7	8645	....	22	Pauji	Clay Sand	Miocene	3050	4550	60–540	Anticline
Tia Juana (VOC)	E-6	5434	445	13	Lagunillas	Clay Sand	Miocene	2850	....	164	Monocline
Tia Juana (MGO)	E-6	1174	231	12–24	El Mene	Clay Sand	Miocene	2850	....	18–140	Monocline
Tarra (CDC)	K-2	2470	....	19–33	Mirador	Sandstone	Eocene	2300	....	65–213	Monocline
Los Manueles (CDC)	J-2	420	....	30–39	Mirador	Sandstone	Eocene	3900	....	39	Dome
La Paz (VOC)	D-4	1359	....	24–34	La Paz	Sandstone	Eocene-Cretaceous	1900	2950	180	Anticline
La Concepcion (VOC)	D-4, 5	2470	....	37	Concepcion	Sandstone	Eocene	1700	....	410	Anticline

[1] See B-5, Map on Page 155.

EMSCO UNIT PUMPERS

Easy, accurate adjustment

▲ Emsco Unit Pumpers are equipped with adjustable wing type counterbalances, offering easy and accurate adjustment.* Any position between zero and maximum counterbalance effect is provided. Emsco Unit Pumpers are shipped with weights attached to crank.

▲ Emsco Unit Pumpers are roller bearing equipped throughout and are provided with herringbone gears.

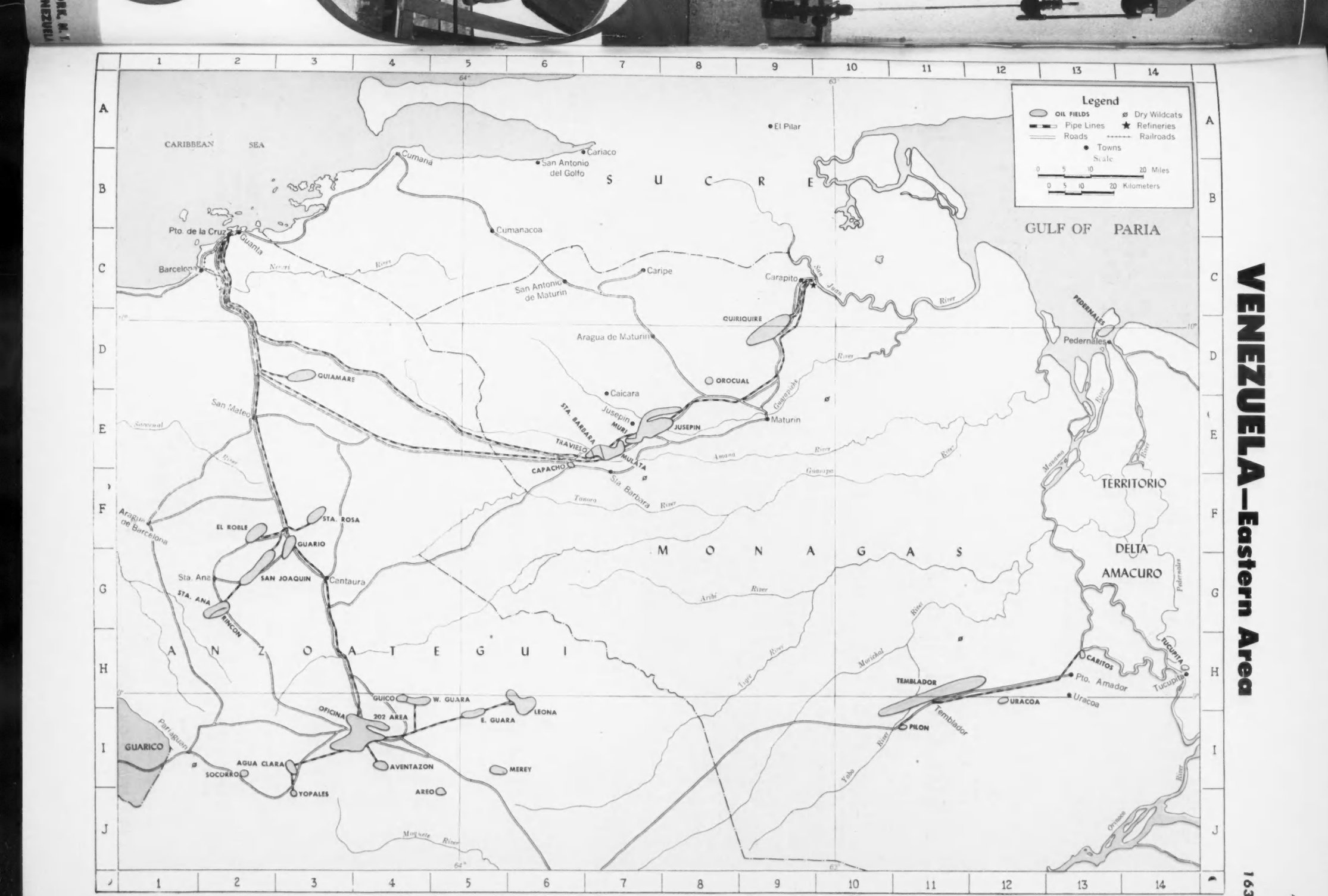
*(DC-38 is equipped with Beam Balances.)

SPECIFICATIONS	DC-38	DD-58-R	DD-77	DA-114	SA-160	SA-228
API Peak Torque Rating at 20 spm. in. lbs.	38,400	58,000	77,300	114,000	160,000	228,000
API Polish Rod Capacity of Walking Beam	8,300	10,400	12,800	14,300	21,200	24,200
Maximum Counterbalance Effect at Maximum Stroke lbs.	4,530 (Beam Balance only)	5,500	6,700	8,200	11,500	15,000
Length Stroke Available	23, 28 33	24, 34, 44	28, 38, 48	34, 44, 54	34, 44, 54	34, 44, 54, 64
Net Weight (approximate)	5,300	7,926	10,600	14,270	19,750	26,320

CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

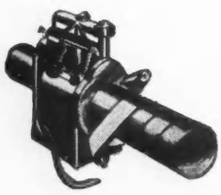
THE CONTINENTAL SUPPLY COMPANY, *General Offices:* DALLAS, TEXAS • EXPORT DIVISION: *30 Rockefeller Plaza,* NEW YORK, N. Y.
Representatives: ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ENGLAND • JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA



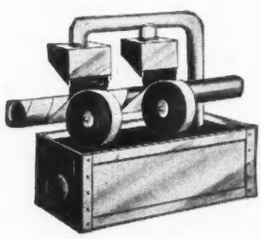
VENEZUELA—Eastern Area

The economics of cathodic protection

require the use of stable pipe protection plus modern methods of application and electrical inspection

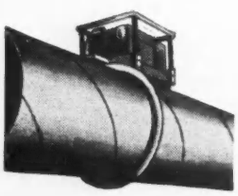


BARRETT Coal-tar Enamels, because of their low moisture absorption under varying conditions of the soils, provide a constant, uniform and long-lasting stable underground insulation.



Mechanically applied by modern methods, these coal-tar enamels assure the proper continuity of the insulation.

Electrical inspection improves the quality of application and the handling of pipe during construction and, together with a pipe protection of stable dielectric strength, makes cathodic protection economical. This combination permits the use of a minimum number of cathodic protection units, spaced the maximum distance, and a minimum investment in the complementary electrical protection. A dependable procedure when designing corrosion-proof pipelines.



FIELD SERVICE: *The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.*

Barrett COAL-TAR ENAMEL

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

VENEZUELA—Eastern Area

DRY wildcats of 1945 were: Texas Petroleum's Manapire 2, southeast of Las Mercedes, 4775 feet; Creole's Maturin 5, east of Jusepin, believed reached Eocene in drilling to 9160 feet; Venezuelan Atlantic and Pantepac, three tests west of Jusepin—Morochito 1 dry at 4945 feet but completed as water well, Morochito 2 abandoned at 3773 feet and Punta Gorda 1 at 6017 feet. *Field openers:* (1) Creole's Capacho 1, west of Jusepin, 150 barrels, 30-gravity oil daily from Miocene sand, total depth 4988 feet, completed in June, closed in October. Four dry holes drilled since. (2) Mene Grande's Nipa 1, in Oficina area, completed in December.

PIPE LINES

Compania Consolidada de Petroleo has constructed a 12-inch 100-mile pipe line from Santa Barbara to its El Chaure terminal at Puerto de la Cruz which, with an intermediate station, has capacity of 75,000 barrels daily.

Creole Petroleum Corporation's 16-inch line from Mulata to Puerto de la Cruz, 105 miles, has capacity of 98,000 barrels daily, and is used by both Creole and Mene Grande for crude from the Jusepin area. Other Creole lines are: Jusepin-Caripito, 44 miles of 10-inch, capacity 55,000 barrels; Mulata-Jusepin, 9 miles of 10-inch, capacity 11,000 barrels; Quiriquire-Caripito, 12½ miles of 8-inch and 11 miles of 10-inch, capacity of both lines, 72,000 barrels; and Temblador-Boca de Uracoa, 29½ miles of 10-inch, capacity 36,000 barrels.

Mene Grande Oil Company's principal line from Oficina to Puerto de la Cruz, 16-inch, 110 miles, with looping and boosters has capacity of 135,000 barrels daily. An 8-inch line from San Joaquin to Anaco pumping station has capacity of 30,000 barrels daily with normal deliveries around 28,000 barrels.

Santa Rosa, El Roble and Santa Ana are connected into Anaco and San Joaquin by 4-inch, 5-mile lines, owned by Mene Grande.

Mene Grande's system from Leona, Guara and West Guara into Oficina is a combination system of 8-, 10- and 12-inch.

An outlet for Las Mercedes field in Guarico (16 producers), is unlikely for another 6 months or a year.

Drilling in East Venezuelan Fields

Field, State	Wells Completed in Fields in 1945					Field Wells Drilling at End of 1945	
				Total			
	Oil	Gas	Dry	Wells	Footage	Dr	Total
Monagas							
Santa Barbara	37	..	1	38	235,600	4	4
Muri	27	..	..	27	113,400	..	..
Mulata	47	3	2	52	270,400	4	4
Travieso	40	1	2	43	240,800	4	4
Jusepin	98	1	10	109	607,600	11	11
Capacho	..	..	4	4	26,240	..	..
Temblador	..	..	..	..	.....	..	..
Los Caritos	..	..	..	..	.....	..	..
Quiriquire	2	..	1	3	14,857	2	2
Anzoategui							
Oficina	8	..	..	8	55,381	1	1
Santa Rosa	..	..	..	..	.....	1	1
San Joaquin	3	..	..	3	20,554	2	2
El Roble	..	..	..	..	.....	1	1
Guario	2	..	..	2	13,851	1	1
Yopales	3	..	2	5	23,820	..	..
Guara	60	..	2	62	427,800	8	8
Guico	17	..	..	17	119,250	2	2
Santa Ana	..	..	..	..	.....	..	..
Rincon	2	..	..	2	7,000	..	..
Quiamare	..	no drilling since 1943					
Leona	..	none since 1942					
Terr. Delta Amacuro							
Pedernales	..	none since 1939					
Tucupita	4	..	..	4	22,814	1	1
Guarico							
Las Mercedes	11	..	2	13	60,060	2	2

No 1946 wells in prospect in Temblador and Yopales. Three such 1946 wells for El Roble.

Oil Production, East Venezuela Fields

*Field Province	Year of Discovery	Oil Wells at End of 1945				Crude Oil Production (Barrels)		
			Producing					
		Shut in	Flowing	Art. Lift	Total Producing	Year, 1944	Year, 1945	Cumulative Through 1945
Monagas								
Sta. Barbara	1941	..	181	..	181	8,176,233	7,410,318	19,521,765
Muri	1942	..	47	..	47	2,444,139	3,038,149	5,482,288
Mulata	1941	..	127	..	127	5,889,550	10,830,067	18,113,272
Travieso	1944	..	57	..	57	435,820	3,337,141	3,782,961
Jusepin	1938	..	262	..	262	11,345,828	17,944,987	54,317,375
Capacho	1945	..	1	..	1	.....	7,032	7,032
Temblador	1936	13	67	..	67	1,088,526	2,102,317	20,129,055
Los Caritos	1939	..	..	..	1	24,090	6,334	52,360
Quiriquire	1928	64	21	213	234	11,537,383	14,457,058	240,007,563
Anzoategui								
Oficina	1933	106	140	28	168	14,563,352	15,259,647	102,164,641
Santa Rosa	1941	..	3	..	3	676,107	548,127	Incl in Oficina
San Joaquin	1939	..	26	..	26	3,753,471	4,035,738	12,761,338
El Roble	1939	..	10	..	10	2,167,431	1,742,636	9,902,040
Guario	1940	..	10	..	10	722,132	1,709,235	2,696,883
Yopales	1937	13	..	..	..	135,213	.....	158,476
Guara	1942	55	108	..	108	8,221,942	18,350,871	27,263,368
Guico	1944	..	22	..	22	305,246	2,378,020	2,683,266
Santa Ana	1936	..	1	1	2	271,478	163,916	Incl. in Oficina
Rincon	1941	..	4	..	4	157,627	657,210	818,170
Quiamare	1943	..	2	..	2	134,845	93,596	456,920
Leona	1940	9	21	..	21	1,389,161	733,047	Incl. in Oficina
Terr. Delta Amacuro								
Pedernales	1935	13	..	..	no production since 1942			9,050,606
Tucupita	1945	4	..	..	4	.....	15,076	15,076
Guarico								
Las Mercedes	.....	16	..	..	...	.....	15,851	.....

Engineering and Geological Data on East Venezuela Fields

Fields, by States	Location on Map Page 163	Proved Area (Acres)	Probable Enlargement	Gravity of Oil (API)	PRODUCING FORMATION						
					Name	Kind	Age	Depth of Wells (Ft.)		Average Thickness of Pay (Feet)	Type Structure
								Minimum to Top of Pay	Maximum Total Depth of Wells		
Estado Monagas											
Quiriquire	D-9	10253	....	19	Quiriquire	Clay Sand	Pliocene	2624	3940	157	Fault
Temblador	H-11	3980	3980	21	Oficina	Fine Sand	Miocene	3600	3930	43	Fault
Jusepin	E-8	13900	....	33	Jusepin	Fine Sand	Miocene	4590	4670	82	Anticline
Sta. Barbara	E-7	2315	....	27-30	S. Barbara	Fine Sand	Miocene	5900	6560	125	Monocline
Mulata	E-7	4394	....	33	Mulata	Fine Sand	Miocene	5240	5900	62	Strat. Trap.
Muri	E-7	625	375	32	Muri	Loose Sand	Miocene	3280	3630	43	Monocline
Estado Anzoategui											
Oficina	I-3	12266	....	25	Oficina	Fine Sand	Miocene	4590	5930	20	Monocline
Guara	H, I-5	3350	....	15	Guara	Fine Sand	Miocene	5200	6560	25	Monocline
El Roble	F-2	9100	....	44	Roble	Compact Sand	Oligocene	....	....	33	Anticline
Leona	H-6	3711	1600	26	Leona	Lutitas	Miocene	....	....	18	Fault
San Joaquin	G-2	7692	....	39	S. Joaquin	Clay Sand	Mioligocene	6230	6560	50	Anticline
Santa Rosa	F-3	1500	2000	42	S. Rosa	Fine Sand	Mio-eocene	7546	10400	20	Anticline
Terr. Delta Amacuro											
Pedernales	D-13	972	....	21	Pedernales	Loose Sand	Miocene	....	....	248	Anticline

MANUFACTURERS OF

METALLIC • PLASTIC • RUBBER • FIBROUS PACKING and GASKETS

FOR ALL PURPOSES

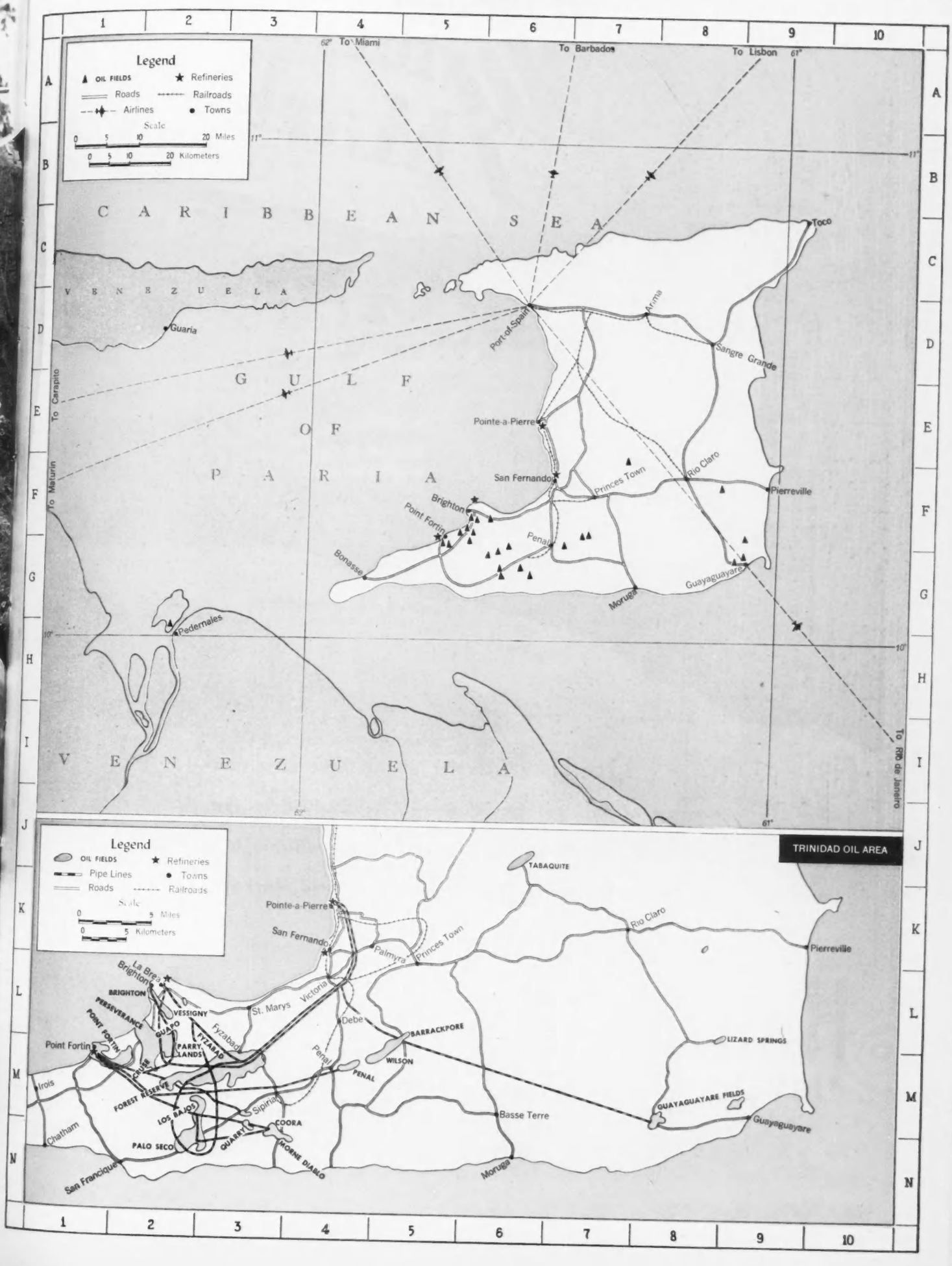
AVAILABLE THROUGH YOUR LOCAL SUPPLY DEALER

UNIVERSAL PACKING & GASKET COMPANY

5210 Clinton Drive **Telephone Charter 42524**

Houston, Texas

TRINIDAD


Legend
OIL FIELDS
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 5 10 20 Miles
0 5 10 20 Kilometers
CARIBBEAN SEA
VENEZUELA
GULF OF PARIA
To Miami
To Barbados
To Lisbon
To Caripito
To Maturin
To Rio de Janeiro
Toco
Arima
Port-of-Spain
Sangre Grande
Guaria
Pointe-a-Pierre
San Fernando
Princes Town
Rio Claro
Pierreville
Brighton
Point Fortin
Penal
Bonasse
Moruga
Guayaguayare
Pedernales
Legend
OIL FIELDS
Refineries
Pipe Lines
Towns
Roads
Railroads
Scale
0 5 Miles
0 5 Kilometers
TRINIDAD OIL AREA
TABAQUITE
Pointe-a-Pierre
San Fernando
Palmyra
Princes Town
Rio Claro
Pierreville
La Brea
Brighton
BRIGHTON
PERSEVERANCE
POINT FORTIN
VESSIGNY
GUAPO
PARRY LANDS
FYZABAD
St. Marys
Victoria
Debe
BARRACKPORE
LIZARD SPRINGS
Point Fortin
Fyzabad
Penal
WILSON
PENAL
Irois
CRUSE
FOREST RESERVE
LOS BAJOS
Sipiria
COORA
QUARRY
Basse Terre
GUAYAGUAYARE FIELDS
Guayaguayare
Chatham
PALO SECO
HORNE DIABLO
San Francique
Moruga

CONSERVING the useful volatility and energy of natural gasoline — STA-VOL-ENE is the "Natural" component of motor fuels, available immediately for peace time cargoes to World Markets.

Hanlon-Buchanan, Inc

PIONEER NATURAL GASOLINE MANUFACTURER

EXPORT TERMINALS:
Goodhope, La. Corpus Christi, Tex.
Houston, Texas Texas City, Texas
Baytown, Texas Galena Park, Texas

TULSA, OKLAHOMA
NATIONAL BANK OF TULSA BUILDING
PHONE 4-1101 or L.D. 358 WIRE — OR WRITE P. O. BOX 1559
Cable Address . . . STAVOLENE, Tulsa, U. S. A.

FOREIGN REPRESENTATIVE:
Barks, Williams & Co., Ltd.
4 Lloyd's Ave.
London, England

TRINIDAD

PRODUCTION

TRINIDAD'S most prolific oil area is the Fyzabad structure (includes Forest Reserve and Francique fields). This structure has produced more than 165 million barrels, or more than half of Trinidad's cumulative, and it is this area which is most actively drilling at the present time, having more than half of the total drilling volume fo 41 wells. Of 18 rigs active in Trinidad, the close of the year found three busy on exploration wells and 15 on field development. Operators expect to obtain a few new rigs for exploration. Exploratory wells drilling at the close of the year included two tests by United British Oilfields of Trinidad, one a 10,000-foot test near Point Fortin and another near La Fortitude in the central Range area. Trinidad Petroleum Development Company has a well of exploratory nature just south of the Forest Reserve anticline on the north edge of the Los Bajos field, drilled to below 7000 feet and was setting casing for tests of upper sands.

Anticipated increases in drilling rate will depend upon a number of factors, not the least of which is materials. Operators will be required to buy most of their material from British sources, and the availability of such materials will depend greatly upon an expansion of Britain's facilities for manufacture of oil field materials.

REFINERIES

Trinidad has total refining capacity in excess of present production with total of 75,000 barrels daily in two plants.

Trinidad Leaseholds, Ltd.'s refinery at Point a Pierre, near San Fernando, has a capacity of 50,000 barrels daily, of which 20,500 barrels daily is cracking capacity plus reforming capacity of 15,100 barrels daily. The plant is making all products except wax. On January 1 it was operating at about 35,000 barrels daily, 24,000 barrels being the company's own production, plus 9000 barrels purchased regularly from Apex Trinidad, and 1000 barrels from Venezuela.

United British Oilfields, Ltd.'s skimming plant located at Point Fortin, on Irois Bay, has crude charging capacity of 25,000 barrels a day, and makes a complete line of products.

* * *

The cooperation of R. S. MacKilligan, Inspector of Mines and Petroleum Technologist, Mines Department, Port of Spain, is gratefully acknowledged.

Trinidad Oil Wells and Production

FIELD	Year of Discovery	Oil Wells at End of 1944				Crude Oil Production (Barrels)		
		Shut in	Producing: Flowing	Producing: Art. Lift	Producing: Total Producing	Daily at End of 1944	Year 1944	Cumulative Through 1944
Barrackpore—Penal	1911	55	15	72	87	4,979	1,581,501	13,441,691
Brighton	1910	53	17	30	47	1,069	417,326	4,839,719
Coora-Quarry	....	53	109	105	214	8,871	3,187,951	20,880,562
Fyzabad	1914	480	208	434	642	27,012	10,099,250	153,846,307
Guapo	....	268	204	115	319	11,810	4,396,275	54,629,338
Guayaguare	1902	....	....	....	....	1,400	503,537	6,779,140
Los Bajos	1915	9	5	38	43	533	213,164	2,858,462
Palo Seco	1910	169	37	152	189	1,804	657,726	21,775,787
Point Fortin	1908	96	26	44	70	1,586	573,884	8,847,284
Other Small Fields	....	43	30	33	63	1,401	507,888	6,886,800
Abandoned	....	....	....	....	....	....	....	2,088,617
Total	....	1226	651	1023	1674	60,466	22,138,502	296,873,707

Engineering and Geological Data on Trinidad Oil Fields

FIELD	Location on Map Page 167	Proved Area (Acres)	Probable Ultimate Proved Area	Range of Gravity Oil (API)	PRODUCING FORMATION: Name	Kind	Age	Depths of Wells (Ft.): Minimum Top Pay	Depths of Wells (Ft.): Maximum Total Depth	Type Structure
Forest Reserve	M-2	1200 1500	....	14.8-33.2	Forest Cruse	Sand	Miocene	0 1500	3500 8000	Anticline
Barrackpore	L-5	120	1500	17.3-30.6	Wilson	Sand	Miocene	500	3500	Faulted Anticline
Guayguayare	M-8, 9	110	....	15.3-49.9	Forest & Cruse	Sand	Miocene	0	5000	Fault trap
Wilson	M-5	60	....	12.2-25.7	Wilson	Sand	Miocene	....	2500	Faulted Anticline
Cruse	M-5	250	....	13.2-30.5	Cruse	Sand	Miocene	1800	4000	Strat trap.
Palo Seco	M, N- 2, 3	100	2000	17.8-33.4	Forest & Cruse	Sand	Miocene	1500	5500	Strat. trap.
Morne Diablo	N-3, 4	50	....	20-33.2	Cruse	Sand	Miocene	1000	4700	Fault trap.
Quinam	....	40	....	25.9-34.1	Cruse	Sand	Miocene	1000	4300	Fault trap
Fyzabad	M-3	5100	6000	19-30	Forest & Cruse	Sand	Miocene	1500	6500	Anticline
Brighton	L-2	500	800	18	Forest	Sand	Miocene	700	3000	Anticline
Coora-Quarry	N-3	900	1400	25.9	Forest & Cruse	Sand	Miocene	1200	6500	Syncline
Guapo	L-2	3050	3400	16.8-24	Forest & Cruse	Sand	Miocene	1500	5700	Plunging nose
Los Bajos	M-2, 3	400	500	27.5	Forest & Cruse	Sand	Miocene	1000	6000	Fold-Fault
Parrylands	M-2	3000	....	....	....	Sand	Miocene	100	1200	Anticline
Point Fortin	M-2	1300	1300	19.5	Forest & Cruse	Sand	Miocene	1500	7500	Overthrust on fault
Tabaquite	J-6	....	....	42	Tabaquite	....	Eocene	300	500	Thrust fault

Crude Oil Pipe Lines of Trinidad

COMPANY	Origin	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Barrels Daily)	Year Completed
Trinidad Leaseholds, Ltd	Forest Reserve	Pointe-a-Pierre	16.4	12	43,600	1940
Trinidad Leaseholds, Ltd	Forest Reserve	Pointe-a-Pierre	16.2	10	21,600	1928
Trinidad Leaseholds, Ltd	Barrackpore	Phillipine (Joins 12 & 10")	5.6	6	9,000	About 1921
TLL/Siparia Trinidad Oilfields, Ltd	Morne Diablo	San Francique (Joins 12 & 10")	5.7	4	8,600	1939
TLL/Siparia Trinidad Oilfields, Ltd	Siparia	Forest Reserve	4.4	4	7,200	1931
TLL/Trinidad Central Oilfields, Ltd	Cruse	Forest Reserve	4.2	6	7,200	About 1925
Trinidad Leaseholds, Ltd	Guayaguayare	Barrackpore (Joins 6" Barrackpore Line)	21.8	6	8,600	1929

All Lines in use. Guayaguayare-Barrackpore has two pumping stations; others have only one each.

Principal units in the **United British Oilfields of Trinidad** system are: Eighteen miles of 8-inch line from Penal field to terminal at Point Fortin; 7½ miles 6-inch from Quarry field to Point Fortin; 5 miles two 4-inch lines from Coora and Mornediablo to Los Bajos; 8 miles double system, (6-inch and a 4-inch) from Los Bajos to Point Fortin; 23 miles of 6-inch serving Brighton-Guapo area and connecting with the system from Quarry to Point Fortin.

TLL operate lines from sea-loading jetty as follows: two each of 16-inch and 12-inch, 7 of 8-inch, 1 of 6-inch, 2 of 3-inch and 1 of 2-inch.

TLL has a 16.2-mile, 8-inch, 10 million cubic feet daily, natural gas line, operated since 1937 from Forest Reserve to Pointe-a-Pierre.

Look Ahead With First National

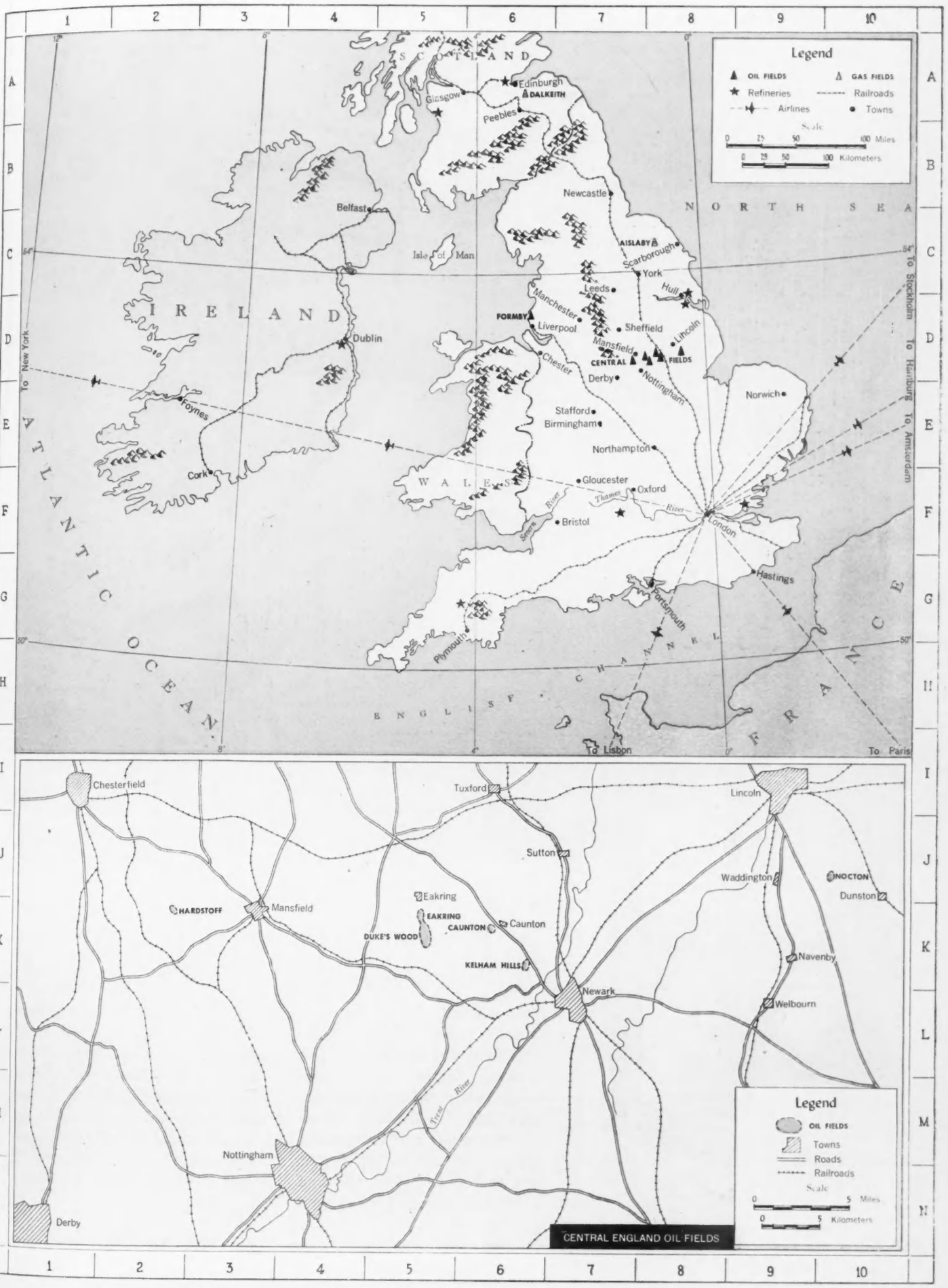
Pioneer in Oil Financing

THE FIRST NATIONAL BANK
AND TRUST COMPANY OF TULSA

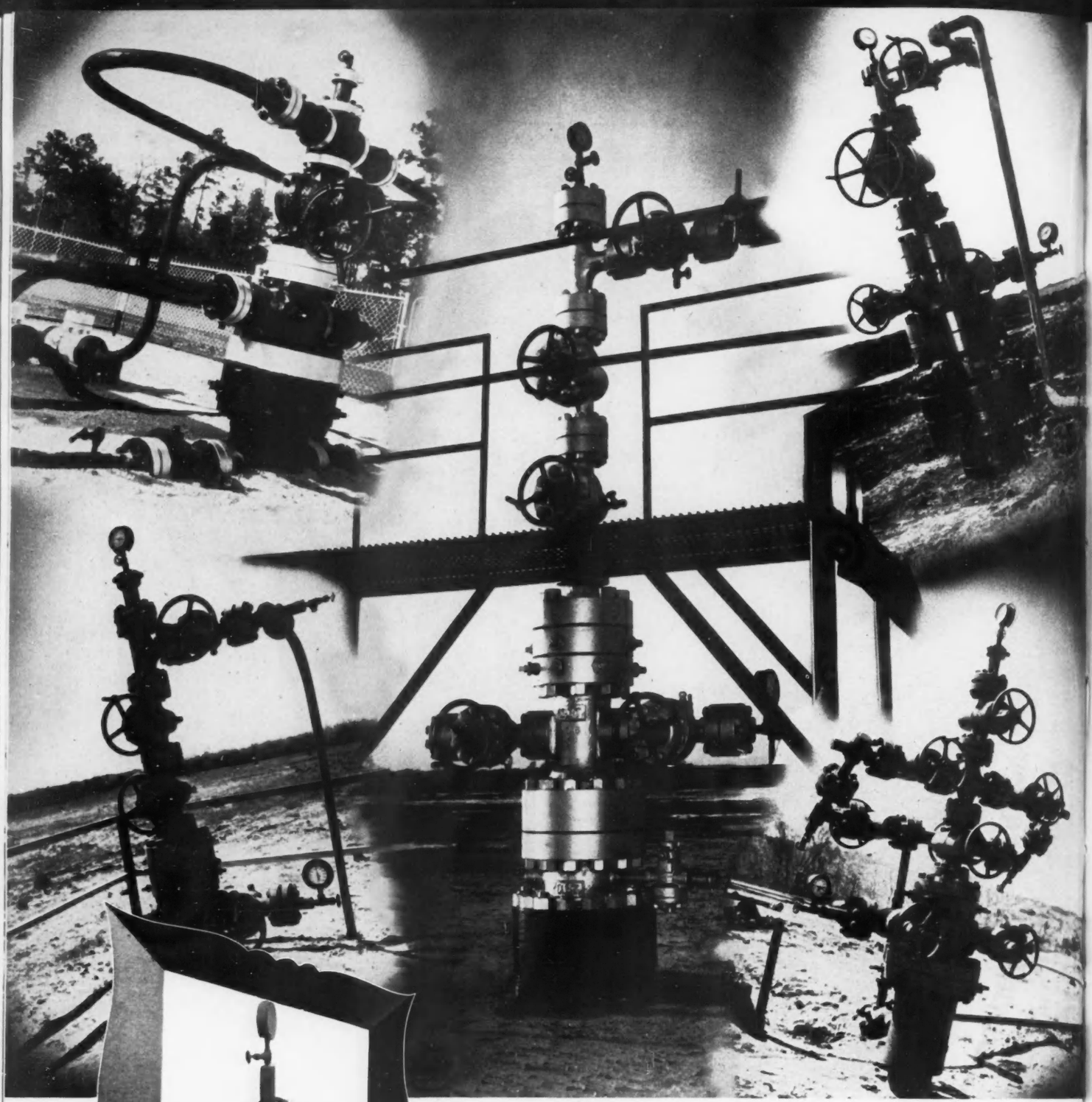
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

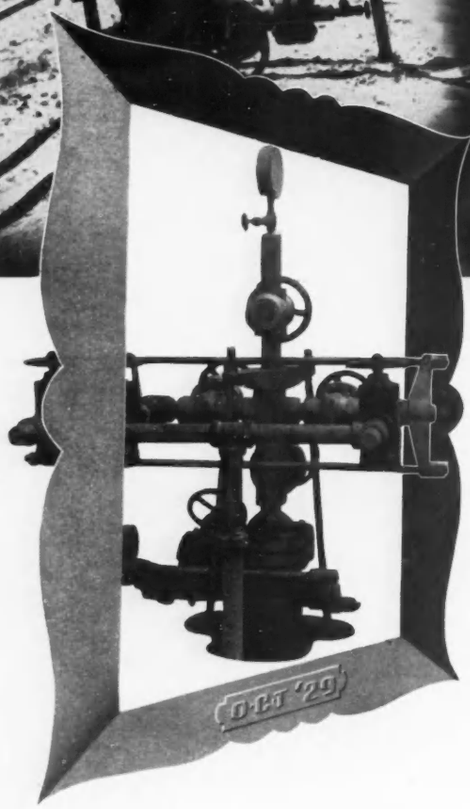
Since 1895

ENGLAND



CENTRAL ENGLAND OIL FIELDS





NEW PICTURES OF OLD FAVORITES—

O·C·T CHRISTMAS TREES

Since the early days of the great East Texas boom, O-C-T Christmas Trees have been a favorite in numerous domestic and foreign fields. That they have maintained their position on the preferred list of many major and independent operators is due largely to the fact that O-C-T field men and engineers have been quick to sense the need for and provide improved designs. Today, no well head equipment manufacturer offers the diversified line of completion tools as does Oil Center. Whatever equipment is required to do the job safely and efficiently can be found in the O-C-T Catalog, a copy of which will be sent gladly on request.

OIL CENTER TOOL COMPANY

HOUSTON, TEXAS

Export: Val R. Wittich, 30 Rockefeller Plaza, New York City—U.S.A.

ENGLAND

D'ARCY Exploration Company was last reported drilling below 3200 feet with some oil and gas shows in its Easter Pardovan 1, Linlithgowshire. Chaldon Down 2 in the Dorset coastal zone, halted in 1939, deepened last year, was abandoned in January, 1946, at 1790 feet in Kimmeridge shale.

Salient Data on Refineries of England

Company, Headquarters Address	Location Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refiney
A. G. W. I. Pet. Corp. Ltd., Brettenham House, Lancaster Pl., London W. C. 2	Fawley	12,000	7,000	S-C-A
Anglo-American Oil Co. Ltd., 36 Queen Anne's Gate, Westminster S.W. 1, Westminster	Port Ellesmere	500	None	Skim-Lube
Berry, Wiggins & Co. Ltd., Water Lane, Stratford, E. C. 2, London	Kingsnorth-on-Medway	2,500	None	Skim-Lube
Berry, Wiggins & Co. Ltd., Water Lane, Stratford, E. C. 2, London	Weaste, N. Manchester	1,500	None	Skimming
Cory Bros. & Co. Ltd., 57-59 St. Mary Ave., E. C., London 3	Coryton	5,000	2,000	Skim-Crk
HerbertGreen&Co.Ltd.,Thames House, Millbank, S. W. 1, London	E. Halton, Lincolnshire	1,500	None	Skim-Lube
Lobitos Oilfields Ltd., 146 Dashwood House, Old Broad St. E. C. 2, London	Port Ellesmere	4,000	None	Skimming
London and Thames Haven Oil Wharves Ltd., 3 St. Helen's Place, E. C. 2, London	Thames Haven	18,000	None	Skim-Lube
Major & Co. Ltd., London	Hull	1,250	None	.....
Medway Oil & Storage Co. Ltd., 76-88 Strand, V. C. 2, London	Isle of Grain, Kent	3,500	2,000	Skim-Crk
Shell Refineries, Ltd., St. Helen's Court, Great St. Helen's E. C. 3, London	Shell Haven	15,000	None	Skim-Lube
London and Coastal Oil Wharves Ltd., 85 Gracechurch St., E. C. 3, London	Canvey Island	1,500	None	Skimming
Manchester Oil Refinery Ltd., Twining Road, Barton, Manchester	Trafford Park	2,000	None	Skim-Lube
National Oil Refineries Ltd.,(Anglo-Iranian) Brittannic House, Finsbury Circus, E. C. 2, London	Llandarcy (Wales)	22,000	3,500	Complete
Shell Refineries Ltd., St. Helen's Court, Great St. Helen's E. C. 3, London	Ardrossan, Ayershire Scotland	5,000	1,500	Complete
Scottish Oils Ltd., (Anglo-Iranian) 53 Bothwell St., E. C. 2, Glasgow	Uphall, Scotland	2,500	500	S-C-Lube
	Grangemouth, Scotland	15,000	4,000	S-C-Lube
William Briggs & Sons, E. Camperdown St., Dundee	Dundee, Scotland	700	None	Skimming

All plants reported in operation.

England's Producing Oil Wells and Crude Oil Production, by Fields
(November, December, 1945, Estimated)

FIELD†	Year of Discovery	Oil Wells at End of 1945 Producing: Art. Lift	Oil Wells at End of 1945 Producing: Total Prod.	Crude Oil Production—(Barrels): Daily at End of 1945	Year 1944	Cumulative Through 1944	Year 1945	Cumulative Through 1945
Eakring	1939	51	51	310	161,000	743,000	121,000	864,000
Duke's Wood	1943	112	112*	625	336,000	1,138,000	259,000	1,397,000
Kelham Hills	1943	53	53	285	154,000	516,000	113,000	629,000
Caunton	1943	9	9	95	39,000	56,000	35,000	91,000
Formby	1939	8	8‡	10	6,000	47,000	4,000	51,000

† All fields in Nottinghamshire, except Formby in Lancashire.
* One well shutin.
‡ 6 wells shutin.

Wildcats Completed in England and Scotland in 1944 and 1945

WELL AND LOCATION	Date Completed	Total Depth (Feet)	Formation Finished In
Lanarkshire			
Salsburgh No. 1	5-11-45	4267	Devonian
Linlithgowshire			
Blackness No. 1	9-27-45	2455	L. Carboniferous
Easter Pardovan No. 1	.....	....	Drilling
Lancashire			
Formby No. 1	.....	6382	Suspended ?
Formby No. 3	7- 7-44	5735	U. Carboniferous ?
Bickerstaffe No. G 1	3-29-44	1901	Millstone Grit
Upholland No. G 1	5-22-44	1950	Millstone Grit
Leicestershire			
Sproxton No. 1	8-12-45	3012	Pre-Cambrain ?
Lincolnshire			
Long Bennington G 1	6- 6-44	2358	.....
Long Bennington G 2	6-26-44	986	.....
Nocton 3-A	2- 4-44	3190	Carb. Limestone
Nocton 4	1- 6-44	3174	Carb. Limestone
Nocton 5	3- 8-44	3175	Carb. Limestone
Nocton South No. 1	4- 5-44	3087	Carb. Limestone
Dunston No. 1	2-10-44	4265	Carb. Limestone
Stixwould No. 1	1- 5-45	4771	Carb. Limestone
Spital No. 1	8-30-44	5594	Carb. Limestone
Norfolk			
North Creake No. 1	5-15-45	2632	Pre-Cambrian ?
Nottinghamshire			
Thorpe No. 1	1- 4-45	2270	Carb. Limestone
Winkburn No. 1	8- 5-45	2504	Millstone Grit
Norwood No. 1	5- 8-44	3050	Carb. Limestone
Normanton No. 3	12-30-44	2965	Millstone Grit
Normanton No. 4	3-22-45	2859	Carb. Limestone
Springwood No. 1	4-21-45	2560	Millstone Grit
Maplebeck No. 1	3- 8-45	3047	Carb. Limestone
Hockerton No. 1	4-13-45	2554	Millstone Grit
Widmerpool No. 1	6-25-45	6205	L. Carboniferous
Yorkshire			
Lockton No. 1	8-19-45	1499	Lower Lias.
Kirkleatham No. 1	9-22-45	3736	Carb. Series
Aldfield No. 1	10-15-45	429	Carb. Limestone
Sawley No. 1	.....	....	Carb. Limestone
Ellenthorpe No. 1	.....	3598	Carb. Limestone

Note: All tests were abandoned with the exception of the one test in Linlithgowshire which was drilling below 3200 feet at last report.

Engineering and Geological Data on England's Oil Fields

FIELD	Location on Map Page 171	Range of Gravity of Oil (API)	PRODUCING FORMATION: Name	Kind (Lime, Sand, etc.)	Age	Depth of Wells (Ft.): Minimum to Top of Pay	Depth of Wells (Ft.): Maximum Total Depth of Wells	Average Thickness of Pay (Feet)	Type of Structure Salt Dome, etc.
Eakring, Nottinghamshire	K-5	33-34	B. Sandstone Rough Rock Longshaw Grit Chatsworth Grit	Sandstone	Upper Carboniferous	1884	2260	10 50 20 100	Dome with faulting
Duke's Wood, Nottinghamshire	K-5		Ditto* and Lower Carboniferous	Sandstone & Limestone	Upper and Lower Carboniferous	1800 2550	2230 2670	100	Dome with faulting
Kelham Hills, Nottinghamshire	K-6	29	Upper Grit Lower Grit	Sandstone	Upper Carboniferous	2050	2280	40 30	Dome with faulting
Caunton, Nottinghamshire	K-6	29-31	Upper Grit Lower Grit	Sandstone	Upper Carboniferous	2160	2290	15 15	Dome with faulting
Formby, Lancashire	D-6	34-35	Keuper Waterstones	Sand and Shale	Trias	90	120	20	Faulted monocline

Other English fields, all unimportant, are Hardstoft, Derbyshire (K-2); Nocton, Lincolnshire (J-10); Aislaby, Yorkshire (C-8) and Dalkeith, Midlothian (A-6), the latter two being gas only.

* With average thickness, in feet, of pay as follows: B. sandstone, 20; Rough rock, 70; Longshaw grit, 20; Chatsworth grit, 60.

Magcobar

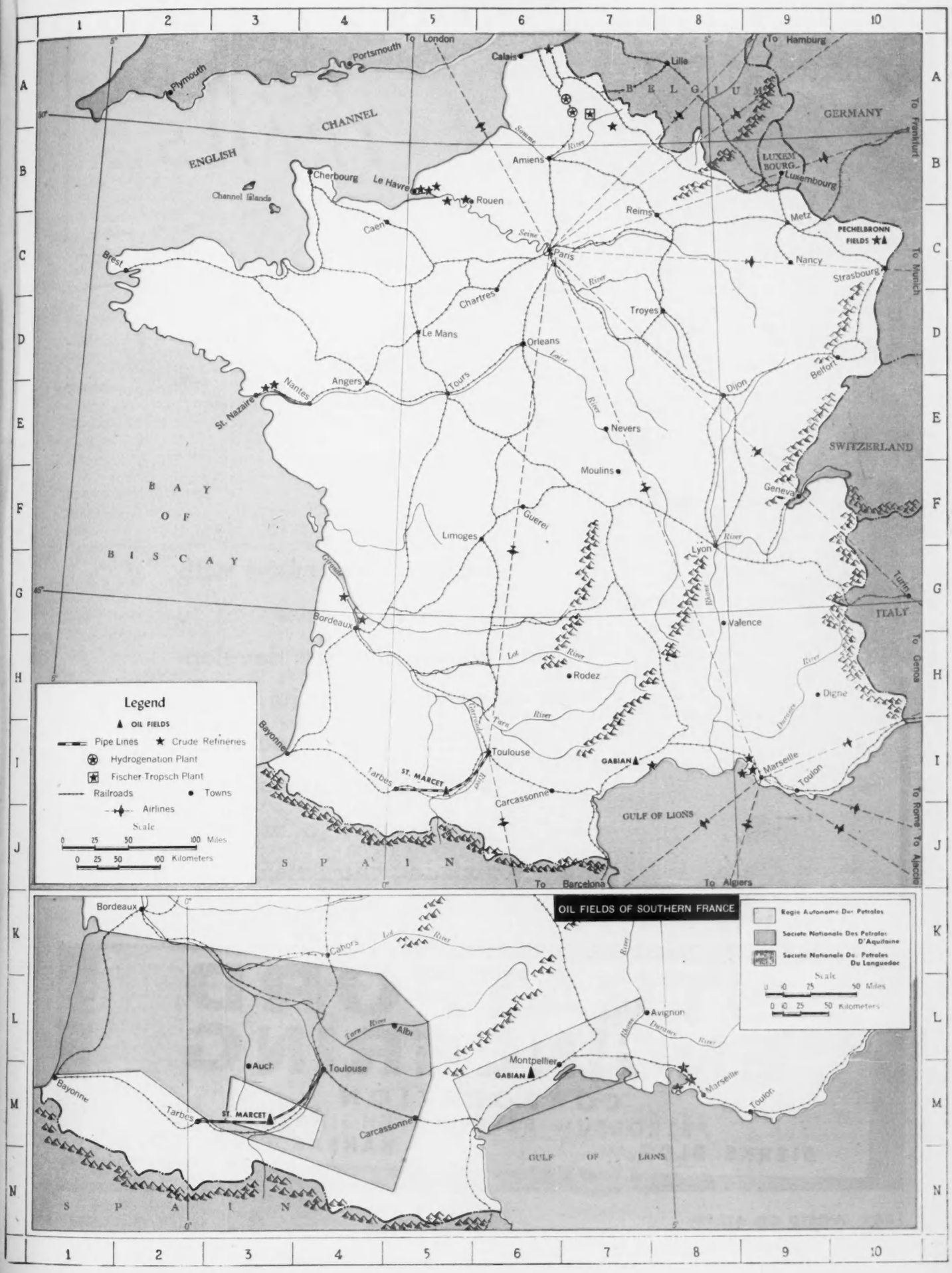
Complete

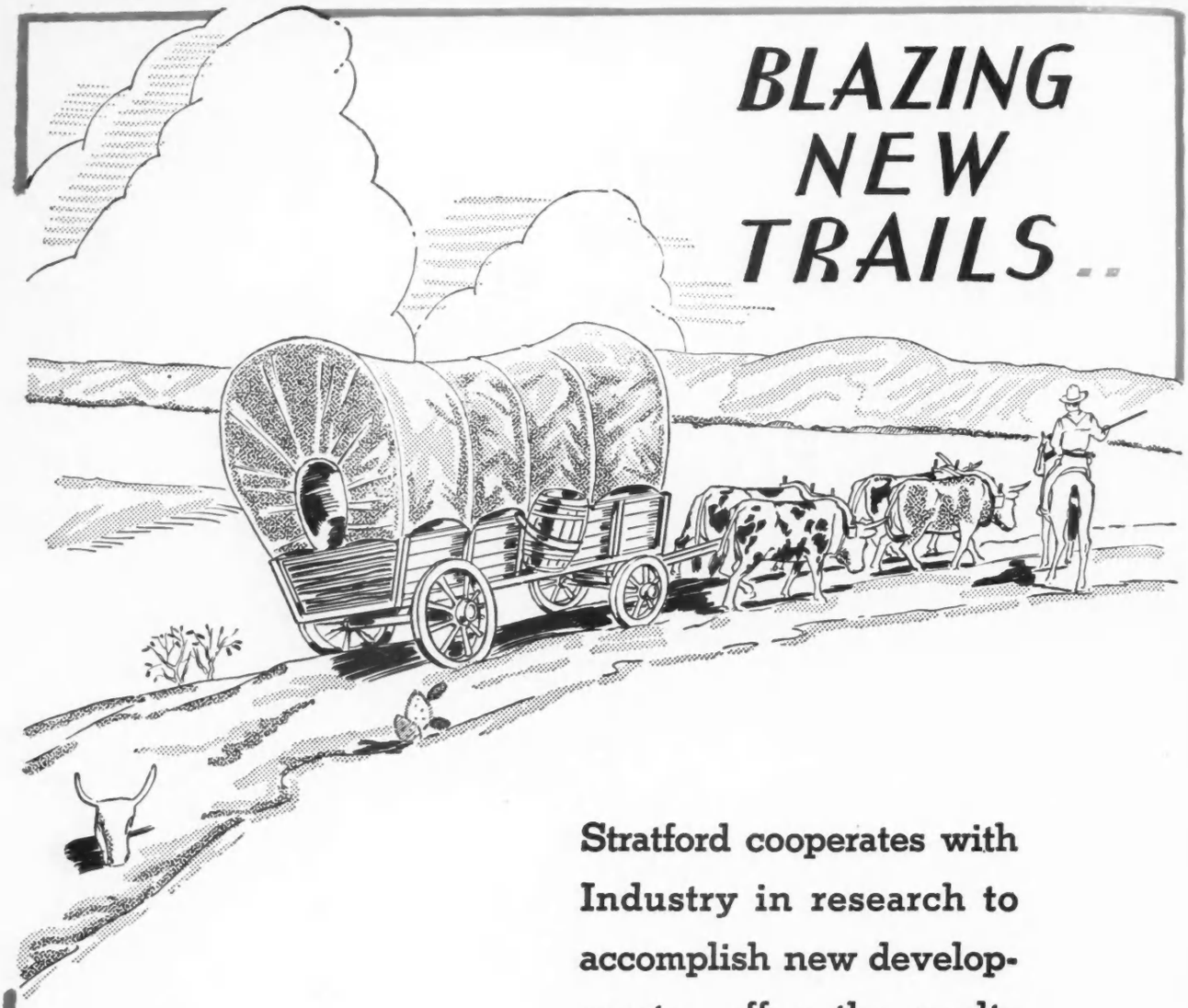
DRILLING MUD SERVICE

Magnet Cove Barium Corporation

Malvern, Arkansas • Houston, Texas

FRANCE


Portsmouth
To London
Calais
To Hamburg
Plymouth
Lille
CHANNEL
BELGIUM
GERMANY
ENGLISH
Somme River
Amiens
LUXEMBOURG
Luxembourg
Cherbourg
Le Havre
Rouen
Channel Islands
Reims
Metz
Caen
Seine River
PECHELBRONN FIELDS
Brest
Paris
Nancy
Strasbourg
Chartres
Troyes
Le Mans
Orleans
Loire River
Belfort
Nantes
Angers
Tours
Dijon
St. Nazaire
Nevers
SWITZERLAND
BAY OF BISCAY
Moulins
Geneva
Guerel
Limoges
Lyon
Rhone River
Turin
Dordogne
ITALY
Bordeaux
Valence
Lot River
Rodez
Digne
Tarn River
Bayonne
Toulouse
GABIAN
Marseille
Toulon
Tarbes
ST. MARCET
Carcassonne
GULF OF LIONS
SPAIN
To Barcelona
To Algiers
To Frankfurt
To Munich
To Genoa
To Rome
To Ajaccio
Legend
OIL FIELDS
Pipe Lines
Crude Refineries
Hydrogenation Plant
Fischer Tropsch Plant
Railroads
Towns
Airlines
Scale
0 25 50 100 Miles
0 25 50 100 Kilometers
OIL FIELDS OF SOUTHERN FRANCE
Regie Autonome Des Petroles
Societe Nationale Des Petroles D'Aquitaine
Societe Nationale Des Petroles Du Languedoc
Scale
0 10 25 50 Miles
0 10 25 50 Kilometers
Cahors
Albi
Auch
Avignon
Montpellier
Durance River



BLAZING NEW TRAILS..

Stratford cooperates with Industry in research to accomplish new developments—offers the results in the form of technical service and specialized equipment to improve existing processes.

STRATFORD ENGINEERING CORPORATION

PETROLEUM REFINING ENGINEERS

DIERKS BLDG. KANSAS CITY, MO.

FRANCE

PRODUCTION

THE Pechelbronn field, discovered in 1882, is located in the northeastern corner of Alsace, near the German border, has been exploited for its pitch for more than 200 years. As early as 1745, shafts were sunk to mine the oil and in 1866 these shafts were sunk as deep as 250 feet. The first drilling for oil occurred in 1882.

Before World War II, the field produced about 70,000 tons (499,030 barrels) annually. Of this production, drilling yielded about 40,000 tons (285,160 barrels) and the balance came from the shafts and tunnels.

The field had 616 pumping wells in November, 1945, with a daily production of about 925 barrels. This compared with 857 pumping wells at the end of 1944 and a production of 1250 barrels daily in September, 1944.

Daily production at the end of 1945 was 750 barrels, with the year's total production 191,240 barrels with cumulative through 1945 estimated at 18 million barrels.

Although Pechelbronn was bombed severely during the war, great activity is expected in this area during 1946 with production expected to surpass prewar levels.

The field is not considered as a single unit, but as a succession of small oil fields. Producing formations include the Oligocene, Jurassic and Triassic sands, the type structure a faulted anticline. Average completion depth is 2000 feet. The principal leaseholder is Mines de Pechelbronn.

Most recent discovery is the Saint Marcet field in Haute Garonne province located on a 600,000-acre concession held by Regie Autonome des Petroles, a wholly-owned government concern. The field, located on an anticline, was discovered in July, 1939, as a gas area but development failed to materialize until November, 1942, when an outlet for the gas was made available. Limestone horizons producing oil and gas are found at 5000 and 6000 feet in the Cretaceous.

At the end of 1945, 13 wells had been completed in the field, with 10 producers. At the beginning of the year two rigs were active.

Because of the lack of materials and outlets only one well produces in the field at a time. Daily production at the end of 1945 was 18 barrels of 31-gravity oil and 8 million cubic feet of gas. Extraction averages .8 gallon of distillate from 1000 cubic feet of gas. Production during 1945 totaled 6300 barrels with cumulative production through 1945 being 15,300 barrels.

In November, 1940, an absorption plant with a capacity of 10 million cubic feet of gas was erected. The field has gas outlets to Toulouse and Tarbes.

The Gabien pool, Herault province, in southern France, discovered in November, 1924, produces from a shallow depth and now is about exhausted. At its peak, it had 14 wells and now only three wells are producing only four barrels of oil daily. Total cumulative production is about 150,000 barrels.

Recent and Prospective Drilling in France

Field and State	Wells Completed in Fields in 1945				Field Wells Drilling and Rigging Up, at End of 1944			Drilling Prospect, 1946
	Gas	Dry	Total Wells	Total Footage	Dr	RU	Total	
Pechelbronn, Bas-Rhin	..	7	7	15,763	..		..	Much activity
St. Marcet, Haut-Garonne	2	..	2	16,266	1	1	2	3 deep tests
Aquitaine Basin, Wildcat Tests	..	6	6	16,096	10	2	12	9 deep tests 4 medium depth tests
Languedoc-Mediterraneen Area, Wildcat Tests	..	2	2	1,557	3	1	4	4 deep tests 5 shallow tests

CONCESSIONS

Concessions totaling several million acres are held by three companies in southern France. Two of the concessions have been explored for oil and much early exploration is expected.

The largest concession is held by Societe Nationale des Petroles D'Aquitaine and borders the Atlantic Ocean below Bordeaux. The next largest is that of Societe Nationale des Petroles du Languedoc Mediterraneen on which is located the exhausted Gabian field. Both of these companies are owned 55 percent by the government and 45 percent by private interests.

A 600,000-acre concession is owned by Regie Autonome des Petroles, a government company, with headquarters at Saint Gaudens. Located on this concession is the important Saint Marcet oil and gas field.

In the Aquitaine Basin 12 tests are reported active with 9 of these tests being projected to deep depths. Four deep tests and 5 shallow tests are in prospect during 1946 on the Languedoc Mediterraneen concession.

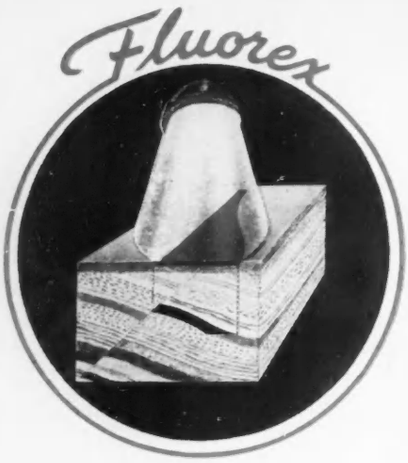
* * *

Cooperation of Jean de Vries, Director, Regie Autonome des Petroles, and M. Guillaumat, Director, des Carburants, Ministere de la Production Industrielle, is gratefully acknowledged.

Salient Data on Refineries of France

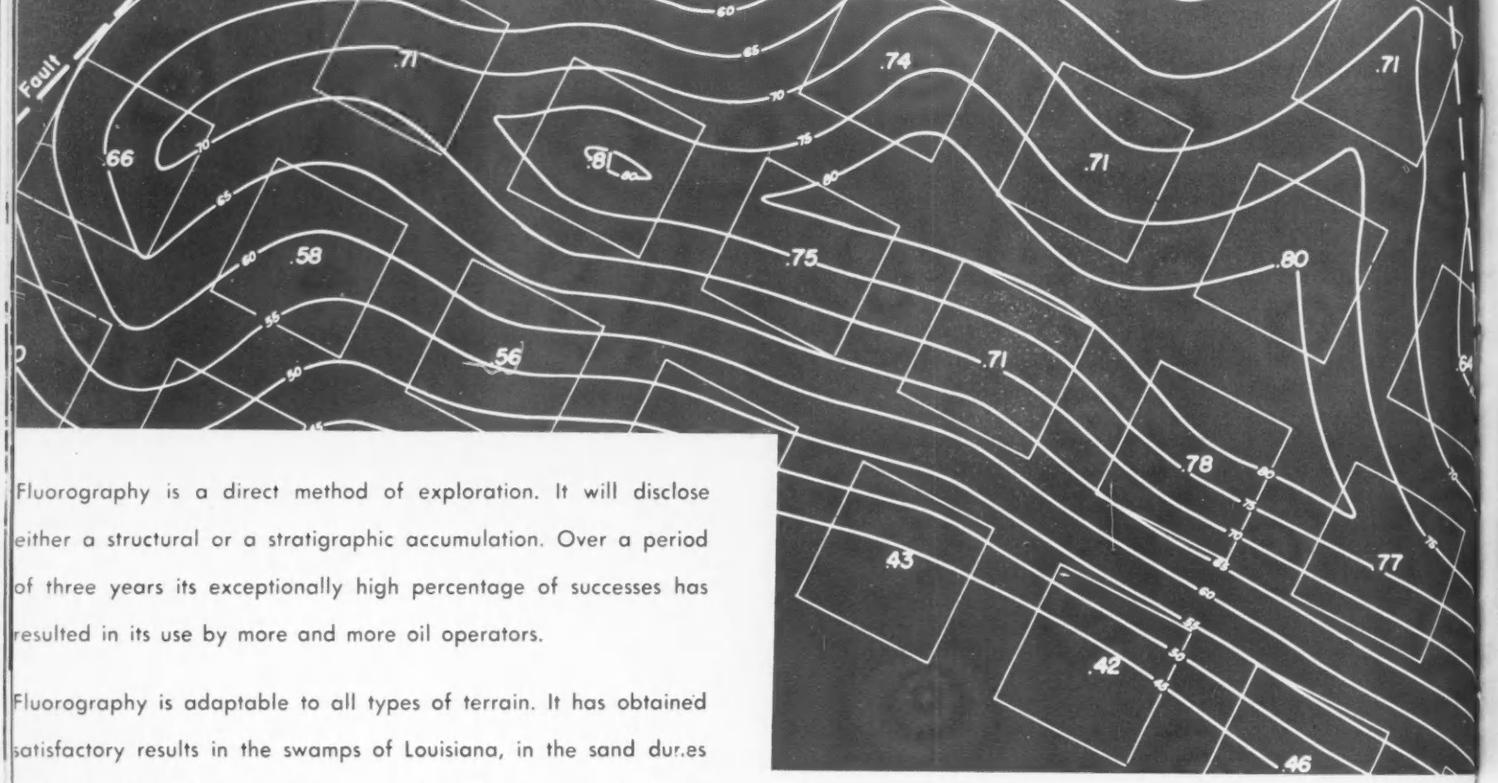
Company, Headquarters, Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
Compagnie Francaise de Raffinage, 11 Rue du Docteur Lancereaux, Paris 8	Martigues*	20,000	5,900	Skim-Crk
	Gonfreville	36,000	8,800	Complete
Compagnie Industrielle des Petroles, S.A.F., 54 Rue de Londres, Paris	Frontignan-Sete	5,000	3,200	Complete
Raffineries de la Vacuum Oil Co., S.A.F., 46 Rue de Courcelles, Paris	Gravenchon	6,000	2,300	Lube-Wax-Asphalt
Compagnie des Produits Chimiques et Raffineries de Berre, 55 Rue d'Amsterdam, Paris 8	Berre*	10,000	4,500	Complete
Les Propetrol Consommateurs de Petrole, Paris	Donges	3,500	None	Skim
Pechelbronn-Ouest, Soc. Anon. (subsidiary of above), 4 Rue Roussell, Paris	Donges†	5,000	None	Skim
Brest Port Petrolier (sub. Pechelbronn Soc. Anon.), 4 Rue Roussell, Paris	Brest	2,000	None	Skim
Raffinerie de Petrole du Nord, 19 Rue du General Foy, Paris, 8e	Dunkerque	10,000	2,000	Skim-Crk
Raffineries de la Vacuum Oil Co. S.A.F., 46 Rue de Courcelles, Paris	Port Jerome	6,500	2,300	Skim-Crk
Societe Anon. des Petroles Jupiter (Shell), 42 Rue Washington, Paris 8	Pauillac	10,000	7,000	Skim-Crk
Soc. Anon. des Petroles Jupiter, 42 Rue Washington, Paris 8	Rouen	15,000	7,000	Skim-Crk
Societe Lyonnaise de Schistes Bituminex (Shell), 21 Rue de Paris	Autun	750	400	Skim-Crk
Soc. de Raffinage des Huiles de Petrole (Anglo-Iranian), 19-21 Rue de la Bienfaisance, Paris 8e	L'Avera*	8,000	3,000	Skim-Crk
	Courcheletts	5,000	2,000	Skim-Crk
Soc. des Raffineries de Petrole de la Gironde (Texas Co.) 7 Place Vendome, Paris	Bordeaux	8,000	3,000	Skim-Crk
Standard Francaise des Petroles, S.A., 82 Ave des Champs Elysees Paris	Port Jerome	24,000	12,000	S-C-L-A
Standard Francaise des Petroles, 82, Ave., Champs Elysees, Paris	La Mailleraye	Reduced crude operation		

All Refineries reported operating except:
* Reported "ready for operation".
† Reported partly destroyed during war.



THE Fluorographic METHOD OF EXPLORATION

DIRECT • ADAPTABLE • ECONOMICAL • RAPID



Fluorography is a direct method of exploration. It will disclose either a structural or a stratigraphic accumulation. Over a period of three years its exceptionally high percentage of successes has resulted in its use by more and more oil operators.

Fluorography is adaptable to all types of terrain. It has obtained satisfactory results in the swamps of Louisiana, in the sand dunes and the caliche of South Texas, as well as in all parts of the oil country.

Fluorography is economical enough to be available to small operators as well as major operators. The cost is based on the area covered, hence the cost is known when a survey is started.

Fluorography obtains the desired information in a relatively short time.

Fluorographic

EXPLORATION COMPANY

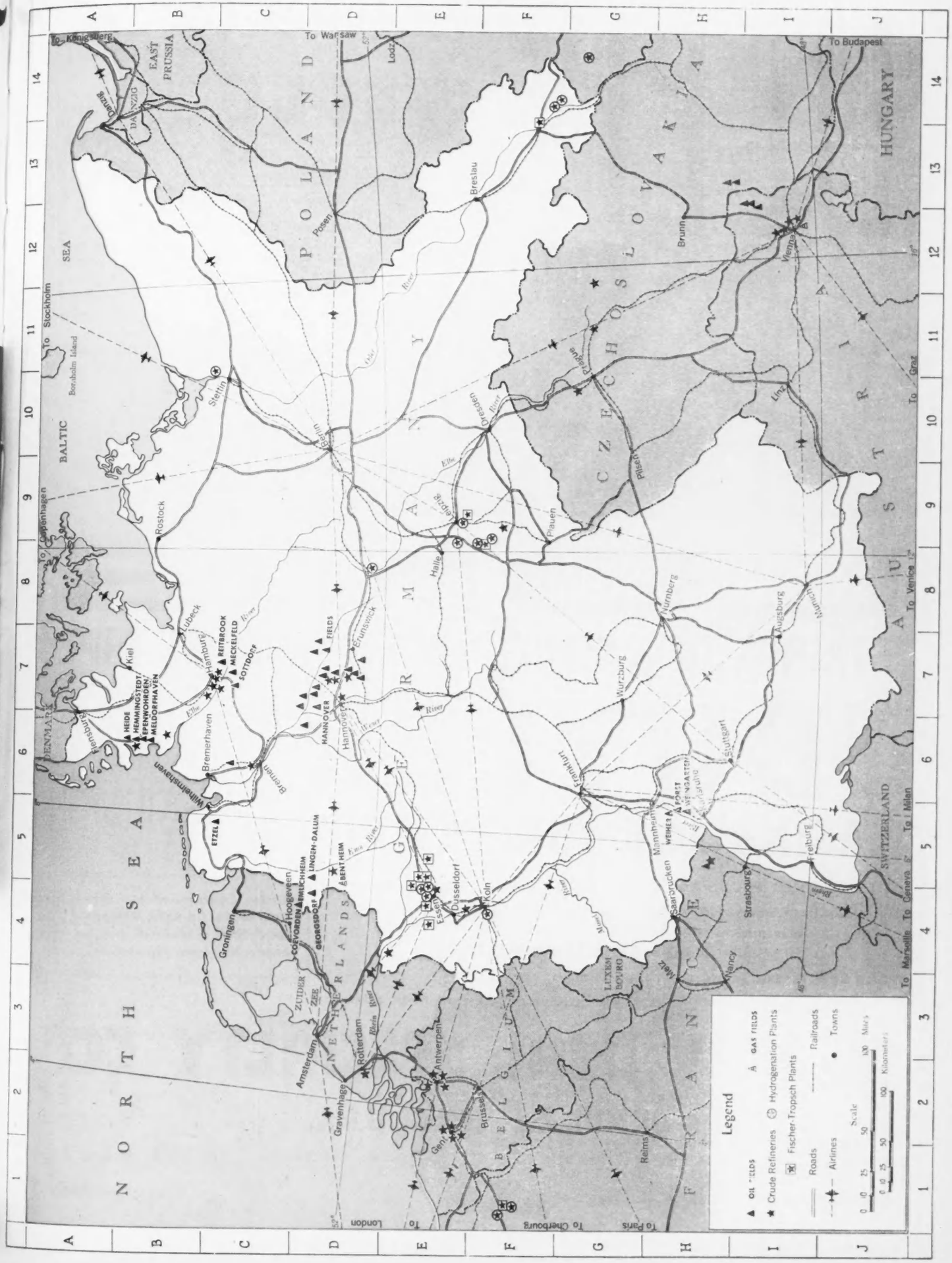
1517 SECOND NATIONAL BANK BLDG. PHONE C. 4-4273

HOUSTON 2, TEXAS

EXPLORATION SURVEYS • WELL LOGGING

GERMANY—NETHERLANDS

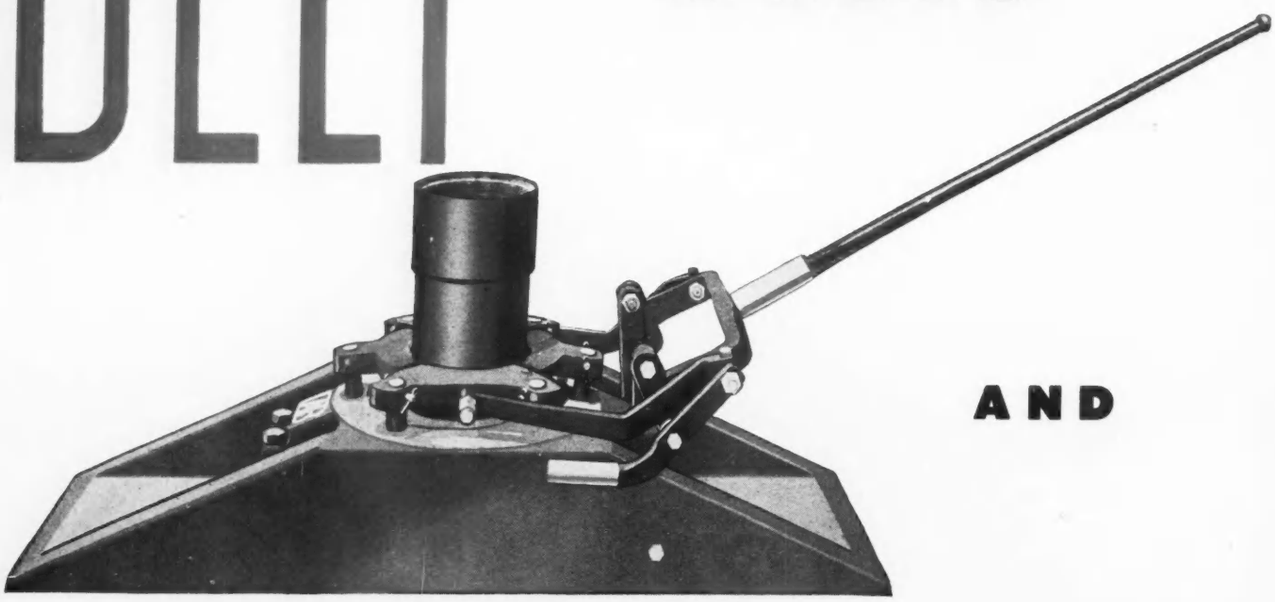
(International Boundaries as of 1938)



DEEP

• • • FOR THOSE

WELLS



AND

LONG

STRINGS OF CASING, TUBING & DRILL PIPE

"BUTLER"

CASING AND TUBING SPIDERS

USED AROUND THE WORLD
NEW DEAL
NEW DEAL SPECIALTY CO.
OKMULGEE, OKLA.

OTHER BUTLER PRODUCTS:

- Slip Ring Casing Elevators
- Automatic Casing Spiders
- Butler Compound Wire Line Drilling Clamps

Also CROTTO and Monarch Drilling Clamps

Butler Equipment has been proven to be safe with any load that a derrick can be made to stand up under.

BUTLER PRODUCTS SOLD ONLY THROUGH SUPPLY STORES

The NEW DEAL SPECIALTY CO.

— INC. —

OKMULGEE, OKLA., U.S.A.

NEW DEAL PIPE CLEANING MACHINES • PIPE STRAIGHTENING MACHINES • OIL FIELD SPECIALTIES

GERMANY

GENERAL DEVELOPMENT

PRIOR to and especially during the war, Germany's oil supply depended on three factors; its crude production, synthetic oil, and imported oil. By these three methods it reached a total oil income of about 100 million barrels annually in 1942 and 1943 at the peak of the Nazi regime. This was divided roughly into 8 percent crude production, 42 percent synthetics and 50 percent imports.

The Germans made desperate efforts during the war to increase their oil supply within its own borders. At times the Seismos Company of Hannover had as high as 28 seismograph crews working in the favored North Germany plain area and in the oil sections of the occupied countries. The drilling and actual discovery of oil did not keep pace with geophysical findings, however, as many structures and salt domes were found, but disappointingly few new oil fields.

Peak crude oil output in Germany was reached in 1940 when annual production totaled 7,366,198 barrels and has declined steadily ever since. During 1944, annual production was 4,980,115 barrels as compared with only 3,771,026 barrels in 1945.

During the war new oil fields were found in the Hannover area, the Dutch Border area near Coevorden in The Netherlands, and the Heide area northeast of Cuxhaven. One gas field was also found near the Dutch Border.

The synthetic oil plants of Germany played an important role in her war effort. There were 12 hydrogenation plants operating in Germany during the war and nine synthetic plants using the Fischer-Tropsch method of hydrocarbon synthesis. The first group of plants produced primarily gasoline, especially aviation gasoline, and the second group produced largely synthetic crude oil.

PRODUCING AREAS

The wartime discoveries of oil and gas near the Dutch border in Germany are of considerable importance. The three principal fields are Georgsdorf, Lingen-Dalum, and Emlichheim. The latter field is undoubtedly part of the Netherlands Coevorden field. The gas discovery is called the Bentheim field and is near the town of that name and northwest of the city of Rheine.

The Georgsdorf field is on a subsurface anticline near Alte Piccardie. There are several flowing wells producing about 200 to 250 barrels daily of heavy oil. The Emlichheim field is making about 300 barrels daily and the Lingen-Dalum field about 350 barrels daily.

The oil of all three fields is transported to refineries by rail. The field collecting is done by pipe line and truck. All drilling was done by rotary. Neither the fields nor equipment suffered during the fighting, the greatest delay to operation now being the lack of transportation and equipment.

The Bentheim gas field is on a structure trending east-west and probably a continuation of the well-known Osning-Axis. Before the close of the war, it produced 10 to 12 million cubic feet of gas daily. Much of this gas was being used to produce synthetic rubber and some for the use of motor cars and trucks.

Germany's largest producing area is the Neinhagen district which includes the Neinhagen, Hanigsen and Eicklingen fields. During 1945, this area produced 1,245,293 barrels of crude oil. The Heide field, which had its peak production of 1,610,994 barrels in 1940, has declined steadily and its output in 1945 was 643,013 barrels. Reitbrook field, near Hamburg, at one time was the largest producing area in Germany. In 1940, its production rose to 2,500,547 barrels. However, its wells were pulled hard during the war and during 1945 the output of this field was only 243,376 barrels. Fuhrberg's production dropped from 409,920 barrels in 1944 to 237,048 barrels in 1945. The recently opened Wesendorf field produced 239,987 barrels in 1944 and this was increased to 343,140 barrels in 1945.

The future, at least for a time, for German oil production is now the problem of the Allied Control Council, composed of the four major powers, which meets in Berlin. The American policy is to eliminate German synthetic plants as a war potential. It has been reported that the Russian (German) synthetic plants are operating on a small percentage basis. The disposition of plants in the British zone is being considered.

The Shell and Socony-Vacuum groups are the two leading oil companies whose properties in Germany were seized, used, and in many cases destroyed. Both government and oil company officials, surveyors, technicians, and geologists have been examining the various oil fields and installations. Since exploratory drilling is at a standstill, it is difficult to see any immediate progress in new discoveries.

German Oil Production by Fields
(In Barrels)

FIELD	Location on Map Page 183	1940	1941	1942	1943	1944	1945
Berkhoepen-Oelheim	I-10	40,012	30,905	42,336	29,829	27,909	19,992
Broistedt	J-10	5,376	6,881	31,535	25,907	17,857	11,424
Coevorden	H-2	.....	.....	.....	35,000	105,000	.....
Ehra	I-11	21,840	11,970	7,616	5,663	2,709	308
Emlichheim	I-2	.....	.....	.....	.....	21,119	35,231
Etzel	E, F-4	.....	.....	.....	12,614	21,973	12,957
Fuhrberg	I-9	89,313	197,841	321,762	360,157	409,920	237,048
Galverlah	.....	.....	.....	.....	.....	.....	1,043
Georgsdorf	I-2	.....	.....	.....	.....	17,178	65,037
Gifhorn	I-10	29,050	25,270	20,636	22,687	21,252	12,425
Hademstorf	H-8	.....	.....	2,800	32,697	70,938	28,490
Hambuehren	.....	.....	.....	.....	7,959	15,547	.....
Heide	C-7	1,610,994	1,446,921	990,150	809,844	842,940	643,013
Hohenassel	J-9, 10	.....	.....	.....	8,036	104,111	219,611
Hope-Lindwedel	H, I-9	.....	.....	.....	.....	.....	.....
Lingen-Dalum	H, I-3	.....	.....	1,358	42,364	134,036	113,246
Meckelfeld	F-9	42,539	43,200	49,210	35,595	32,011	16,289
Moelme	J-9	62,062	49,280	74,963	92,173	100,681	54,362
Neinhagen-Hanigsen-Eicklingen	I-9	2,219,952	2,195,844	2,050,629	2,029,195	1,751,701	1,245,293
Oberg	J-9, 10	119,028	115,598	111,874	106,092	79,275	56,630
Reitbrook	E-9	2,500,547	1,473,325	728,182	368,984	251,979	243,376
Rhine Valley (Baden Weingarten, Forst)	....	68,775	60,130	66,661	71,631	59,751	?
Rodewald	H-8	281,309	359,030	334,460	372,498	374,731	165,004
Sottorf	F-9	11,046	5,404	2,254	868	644	70
Thoren	H-8	.....	.....	88,214	172,333	156,779	106,988
Weitze	H-8, 9	264,355	261,310	253,204	247,828	225,393	139,370
Wesendorf	H-10	.....	.....	.....	79,331	239,987	343,140
Wienhausen	I-9	.....	.....	93,268	8,596	784	679
Total	....	7,366,198	6,282,969	5,271,112	5,005,819	4,980,115	3,771,026

GEOLOGY

Upper Bavarian High Plains—The area between the Alps and the Danube is a Tertiary syncline along the northern border of the Alps. The older Tertiary Flysch is overthrusted on the so-called Molasse which caused faults and folds in the northern part of the basin. A natural oil seep has long been known in the Flysch zone on the Tegernsee. Oil occurs in several horizons—the Flysch sandstones, the Kieselkalk, and the conglomerate zone, but also in the underlying chalk of Alpine Cretaceous.

Upper Rhine Valley Graben—Between the Vosges and the Black Forest is an extended graben with about 6500 feet of Tertiary deposits, mainly belonging to the Oligocene. The western border of the graben belongs to France. There is located Pechelbronn with oil occurrences in several sands in the lower Oligocene. On the German side of the Rhine oil

BUILT IN TEXAS HOBBS USED EVERYWHERE

HOBBS MANUFACTURING COMPANY

FORT WORTH, TEXAS
609 North Main St.

DALLAS, TEXAS
4302 Ross Ave.

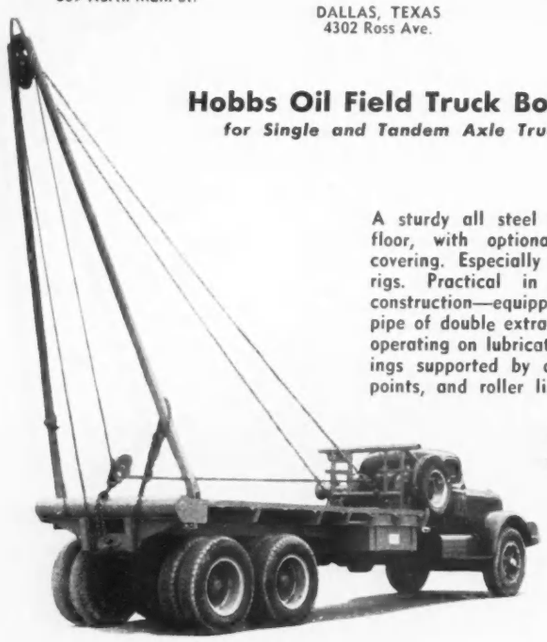
HOUSTON, TEXAS
4510 Navigation Blvd.

LUBBOCK, TEXAS
2706 Avenue H

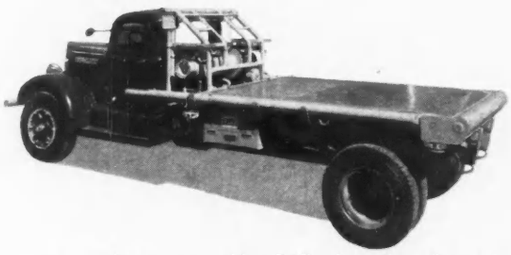
SAN ANTONIO, TEXAS
823 Roosevelt Ave.

Hobbs Oil Field Truck Bodies

for Single and Tandem Axle Trucks



A sturdy all steel body with solid oak floor, with optional steel deck plate covering. Especially valuable for moving rigs. Practical in design—durable in construction—equipped with roller tail pipe of double extra heavy hydraulic pipe operating on lubricated anti-friction bearings supported by overload rollers at 3 points, and roller line guides to prevent wear and tear on cable. Drill pipe gin poles, telescoped in 2 lengths. All steel headache post made of pipe and easily removed for winch repairs and service. Chassis for 1½-ton to 12-ton trucks. Tailormade to fit trucks.



Write, Wire, or Cable for Specifications and Quotations

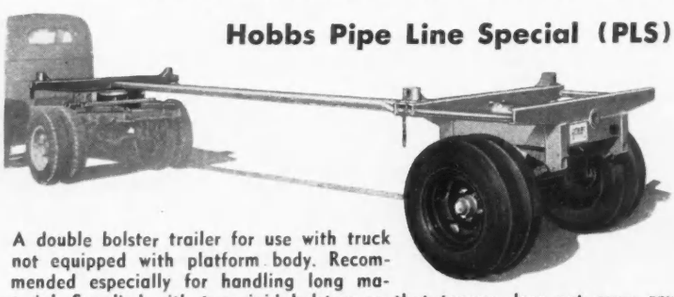
Hobbs WT4 Tandem Pole Trailer

Capacity 60,000 lbs. Truck and Trailer; 30,000 lbs. Trailer alone. No load on pole. Because of separately mounted axles and adjustable ball type tongue, WT4 is used as conventional pole trailer, 4-wheel trailer, or wagon behind truck or tractor.

Hobbs Oil Field Special (OFS)

The HOBBS (OFS) OIL FIELD SPECIAL Trailer is built to be used behind trucks in oil fields where Oil Field Body is on the truck. Both bolsters are fully oscillating to facilitate loading and to permit sharp turns with minimum amount of bending. Pressed steel channel, electrically welded frame assures longer service and fewer repairs. Frame is flexible to eliminate cracking under hard usage.

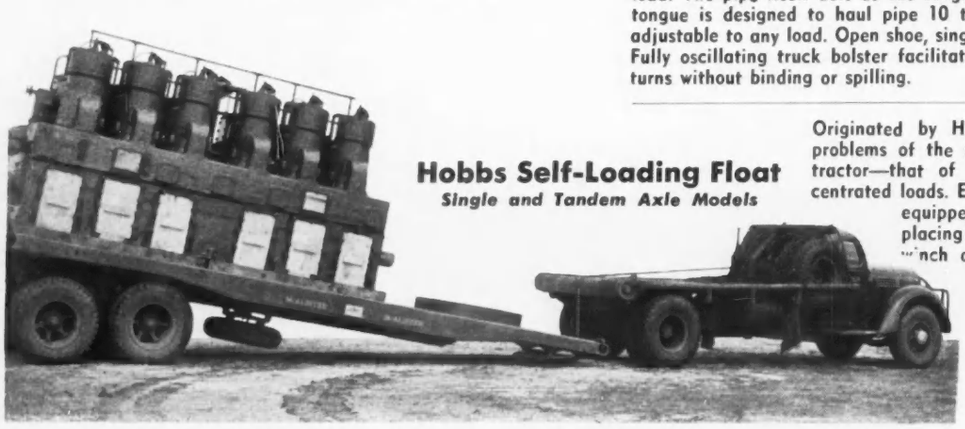
Hobbs Pipe Line Special (PLS)



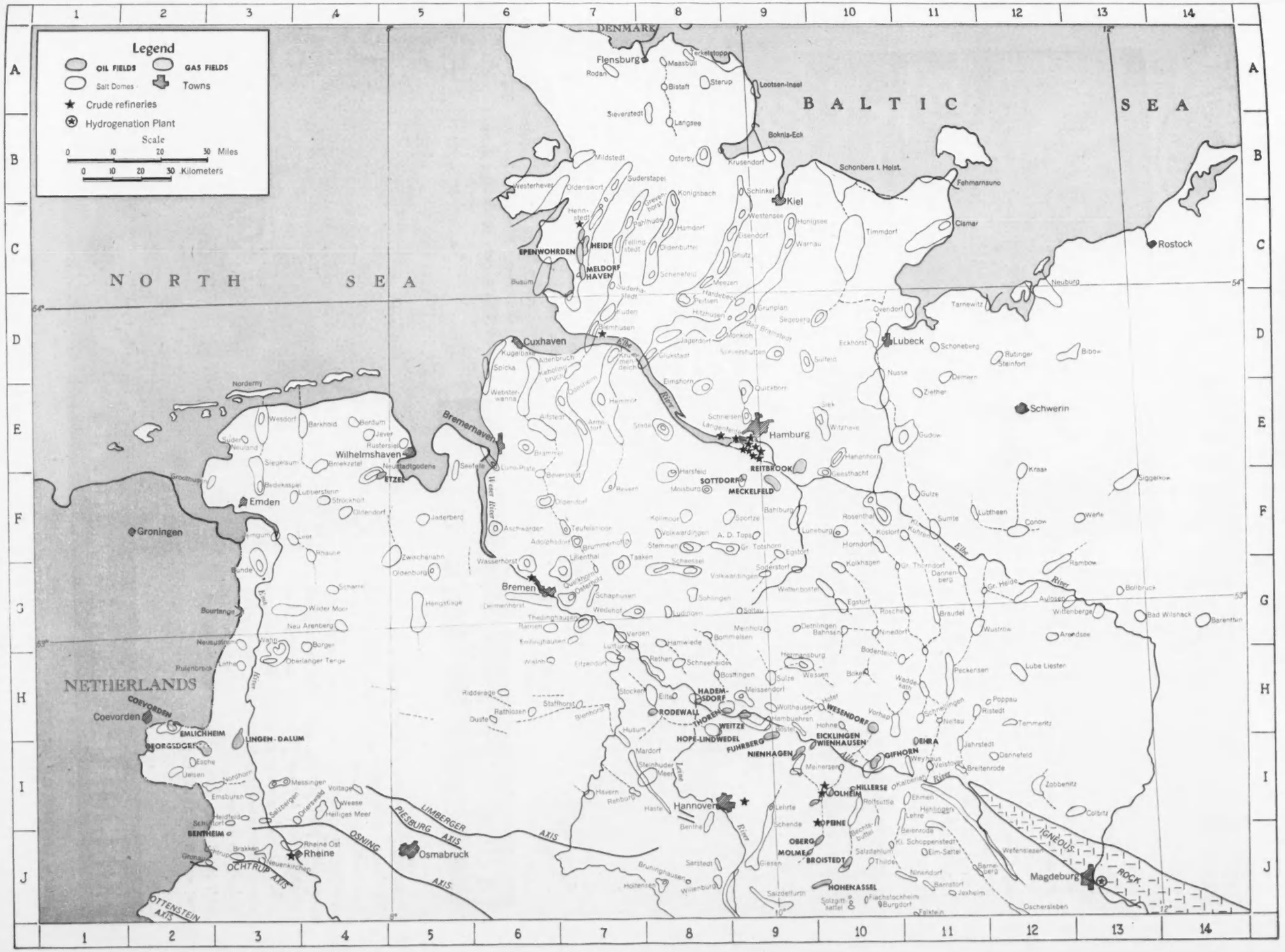
A double bolster trailer for use with truck not equipped with platform body. Recommended especially for handling long material. Supplied with two rigid bolsters so that tongue does not carry any load. The pipe itself acts as the tongue or pulling medium. The telescoping tongue is designed to haul pipe 10 to 40 feet long. The sliding lugs are adjustable to any load. Open shoe, single shackle springs minimize side sway. Fully oscillating truck bolster facilitates loading and enables making sharp turns without binding or spilling.

Hobbs Self-Loading Float

Single and Tandem Axle Models



Originated by Hobbs as solution to one of biggest problems of the oil field operator and the road contractor—that of loading and unloading heavy, concentrated loads. ELIMINATES need of additional trucks equipped with winches and gin poles for placing load on trailer. Makes use of power winch on truck as means of lowering float to ramp position. Then truck is backed up to rear of trailer and winch pulls load on. When load is in place truck is again moved to front and winch lifts trailer back up into traveling position. One man easily can handle entire operation of loading and unloading.

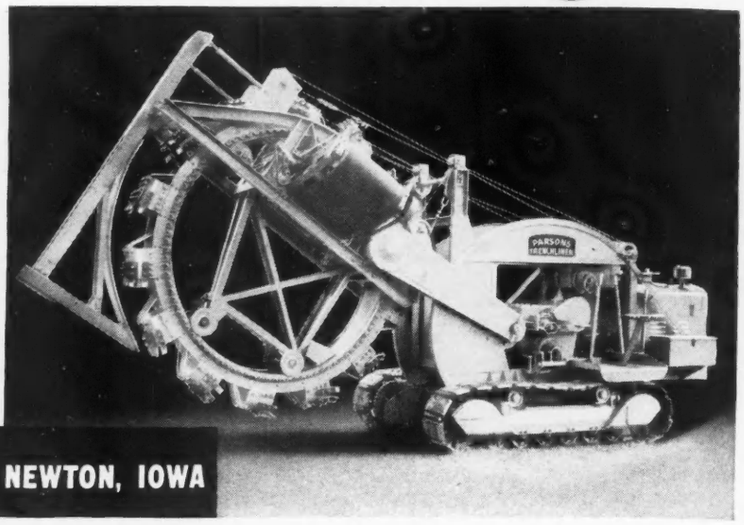


GERMANY—North Basin

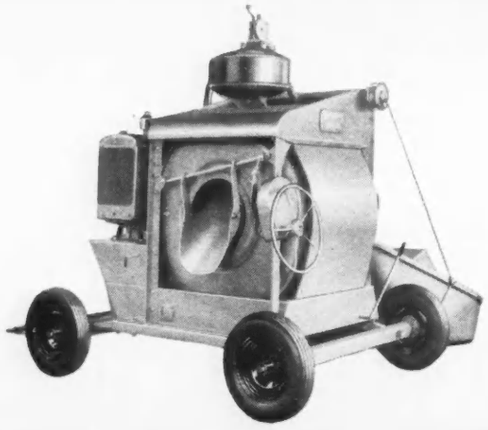
MODERN HEAVY DUTY OIL FIELD CONSTRUCTION EQUIPMENT

KOEHRING PRODUCT

Built for fast mile-a-day pipeline trenching, the Parsons 200 Wheel Trenchliner digs up to 5'6" deep, from 15" to 26" wide. Simple, direct power flow delivers extra power to the wheel. Gears require lubrication only once a season, because they're completely enclosed in oil-tight cases. New pivotal wheel mounting eliminates dirt catching slide tracks, simplifies grading. Shovel type or tractor type crawlers.



PARSONS PARSONS COMPANY, NEWTON, IOWA



Kwik-Mix Concrete Mixers range in size from 3½-S to 16-S. High output and heavy duty construction make them ideally suitable for oil field and pipeline construction work. Carefully balanced on pneumatic tired wheels, they are easily moved from one pouring location to the next. High strength steel at all strain points supplies extra wear resistance where it's needed. Kwik-Mix re-mixing action produces thoroughly mixed concrete every batch. On the 6-S to 16-S sizes, the famous Kwik-Mix Dandie line, new Selective Skip Shaker speeds up drum charging, tilted Flow-Line Discharge Chute cuts discharge time.

KWIK-MIX KWIK-MIX CO., PORT WASHINGTON, WIS.

Because they're built for the toughest going, Koehring excavators stand up well under the beating of oil field service. Easily and quickly convertible to shovel, dragline, crane or pull shovel, they are ready, on short notice, for any oil field construction job. Koehring steering and brake arrangement increases mobility and operating safety. Crawlers are self-cleaning even on soft footings. Sizes range from ½ to 1½ yards, as a shovel.

KOEHRING KOEHRING CO., MILWAUKEE, WIS.

GERMANY—NETHERLANDS

Continued

occurs in two sands of the middle and lower Oligocene and is similar to the Pechelbronn oil. Further oil and gas shows are known in the northern part of the Rhine graben near Heidelberg.

Thuringian Basin—The area between the Harz and Thuringian mountains is formed by Triassic beds, especially Muschelkalk and Kueper, in broad extension at the surface. However, it is a basin which has several anticlines. Below the Triassic is the Zechstein (Upper Permian).

North German Plain—In the North German Plain Zechstein salt is buried at great depth. Sometimes the salt comes in salt anticlines and real salt domes up to the surface and pierces the covering formation which consists of a thick section of Tertiary, Cretaceous, Jurassic and Triassic. More than 100 domes are known in the North German Plain.

GERMAN REFINING DEVELOPMENTS

The rapid developments in refining by the Germans during the 10 years prior to September, 1939, made it possible for the petroleum industry to satisfy the demands of expanding industry and of self-propelling machines by increasing the supply, widening the range, and improving the quality of petroleum lubricating oils.

More widespread and intensive exploration put into the hands of the refiner "lubricating" crudes in larger volume and variety; a better understanding of performance in relation to crude source and refining process played its part; but a great contribution was made by the advancement in the art of refining rooted in the processes which emerged between 1929 and 1939, in largest number and variety from the North American Continent.

New solvent-extraction processes and dewaxing methods, exploiting the differences in solubility of oil, wax, "resins," and asphaltic matter in chosen organic solvents, helped the refiner (and therefore the user) along two main lines. First, they increased the number of crudes from which the refiner could get lubricating oils, and second, by varying the solvent-oil ratios, the operating temperatures, temperature-gradient, etc., the one charging-stock could be made to yield refined lubricating oils which the older methods of refining could be equalled only by the processing of two or more widely different crude oils.

When the war began, the German petroleum refiners had the mechanical means for the manufacture of the whole range of lubricating oils.

NETHERLANDS DEVELOPMENT

The only oil discovered so far in the Netherlands comes from a small field which the Germans developed near Coevorden during their occupation. Just before the outbreak of the war, the N. V. de Bataafsche Petroleum Mij., a subsidiary of the Shell group, drilled four tests in the vicinity of Coevorden, and it is possible that the discovery of oil by the Germans was the result of Shell's preliminary exploratory work.

The Coevorden field covers a proven area of approximately 200 acres. The production is from the Valanginian sand in the Lower Cretaceous age between 2500 and 2650 feet. The average thickness of the sand is 80 feet. The range of gravity of the oil is 25-degrees. The structure is defined as an anticline. In 1944, the Coevorden field produced a total of 105,000 barrels.

During 1945, five oil wells were drilled and completed at Coevorden with a combined footage of 13,400 feet. At the end of 1945, one test was drilling and rigs were being assembled to drill two other locations. A sharp increase in drilling in the field is expected during 1946.

A Shell subsidiary operates a skimming-asphalt-cracking plant at Rotterdam (Pernis). This plant has a capacity of 15,000 barrels daily and an additional cracking capacity of 12,500 barrels daily.

The subsurface geology of the western and the northwestern part of the country appears to be sufficiently favorable for the accumulation of oil to warrant a thorough search.

Unconsolidated deposits of sand, clay, graven and peat, chiefly Pleistocene age, conceal bedrock thoroughout all of The Netherlands except for small exposures of Tertiary and Mesozoic strata that appear near the German border in the eastern part of the provinces of Overijssel and Gelderland and in the southern sector of the Limburg panhandle. This cover of unconsolidated sediments increases to the northwest and is 1000 feet thick in central and western Holland.

Germany Hydrocarbon Synthesis (Fischer-Tropsch) Plants

PLANT	Location	Feed Stocks	Daily Output (Barrels)
Castrop-Rauxel	Ruhr	Hard coal or coke	1,150
Deschowitz-(Odertal)	Silesia	Hard coal or coke	1,150
Dortmund	Ruhr	Coke oven gas	1,150
Holten-Sterkade	Ruhr	Hard coal or coke	1,550
Homberg	Ruhr	Hard coal or coke	1,550
Kamen	Ruhr	Hard coal or coke	1,150
Luetzkendorf	Leipzig	Lignite	1,550
Ruhland-Schwarzheide	Leipzig	Lignite	3,450
Wanne Eickel	Ruhr	Coke and gas	1,150
Total			13,850

German Hydrogenation Plants

Plants Operating On	Location	Feed Stocks	Production Motor Gasoline Barrels Daily
Bituminous Coal and Tar:			
Blechhammer, North	Silesia	H. T. C. Tar	4,500
Blechhammer, South	Silesia	Bit. Coal	6,500
Bottrop-Welheim	Ruhr	H. T. C. Tar	2,200
Gelsenkirchen	Ruhr	Bit. Coal	7,500
Poelitz	Stettin	Bit. Coal & Tar	13,000
Scholven	Ruhr	Bit. Coal	9,000
Lignite Coal and Tar:			
Boehlen-Rotha	Leipzig	L. T. C. Tar	6,500
Leuna	Leipzig	Liginite and Tar	13,000
Luetzkendorf	Leipzig	L. T. C. Tar	3,000
Magdeburg	Magdeburg	L. T. C. Tar	5,500
Wesseling	Cologne	Lignite	4,500
Zeitz-Troeglitz	Leipzig	L. T. C. Tar	7,500
Total			82,700

German Crude Oil Refineries (1944)

Company Name	Location	Estimate Daily Capacity (Bbls.)
Europsische Tankiager	Hamberg (Petroleumhafen)	7,500
Rhenania-Ossag	Hamberg (Harburg)	10,000
Rhenania-Ossag	Hamberg (Grasbrook)	2,000
Ebano Asphaltwerke	Hamberg (Hamburg)	8,000
Mineralol and Asphaltwerke	Hamberg (Ostermoor)	2,500
Deutsche Petroleum	Hamberg (Wilhelmsburg)	1,200
Julius Schindler	Hamberg (Wilhelmsburg)	750
Rhenania-Ossag	Hamberg (Wilhelmsburg)	1,200
Ernest Schliemann	Hamberg (Wilhelmsburg)	1,200
Albracht	Hamberg (Wilhelmsburg)	500
Deurag and Merag	Hannover (Misburg)	6,000
Julius Schlindler	Hannover (Peine)	350
Deutsche Gasolin	Hannover (Dollbergen)	750
Niedersachsen-Norddeutsche	Hannover (Dollbergen)	200
Deutsche Petroleum	Rositz	1,800
Deutsche Vacuum	Bremen (Oslebshausen)	1,000
Deutsche Gasolin	Emmerich	1,200
Ersag Wintershall	Salzbergen	500
Schmitz-Westfalische	Dortmund	300
Rhenania-Ossag	Monheim	2,000
Deutsche Vacuum	Schulau	350
Hemmingstedt	Molle	3,500

J. C. Britton, Manager, 20 years pipeline construction. Lt. Colonel two years U. S. Army, supervising construction of 1650 miles of pipeline in India and Burma.

BRITTON & CLARK

offers you

Pipeline Construction

with

Personal Supervision on All Jobs

Roy Clark, Job Superintendent, 27 years in pipeline construction. Experience construction of refineries, pipeline pump stations and dams.

H. R. Britton, Job Superintendent, 16 years pipeline construction in supervisory capacity for different contractors.

Hugh W. Lambert, Office Manager, 20 years in major pipeline operation and accounting.

A NEW PARTNERSHIP
WITH 20 YEARS
AVERAGE EXPERIENCE

Specialists

- √ **Marine Crossings**
- √ **Reconditioning Pipeline Work**

Equipment

2 Complete Spreads of Equipment, Capable of Handling up to 26 Inch Pipe

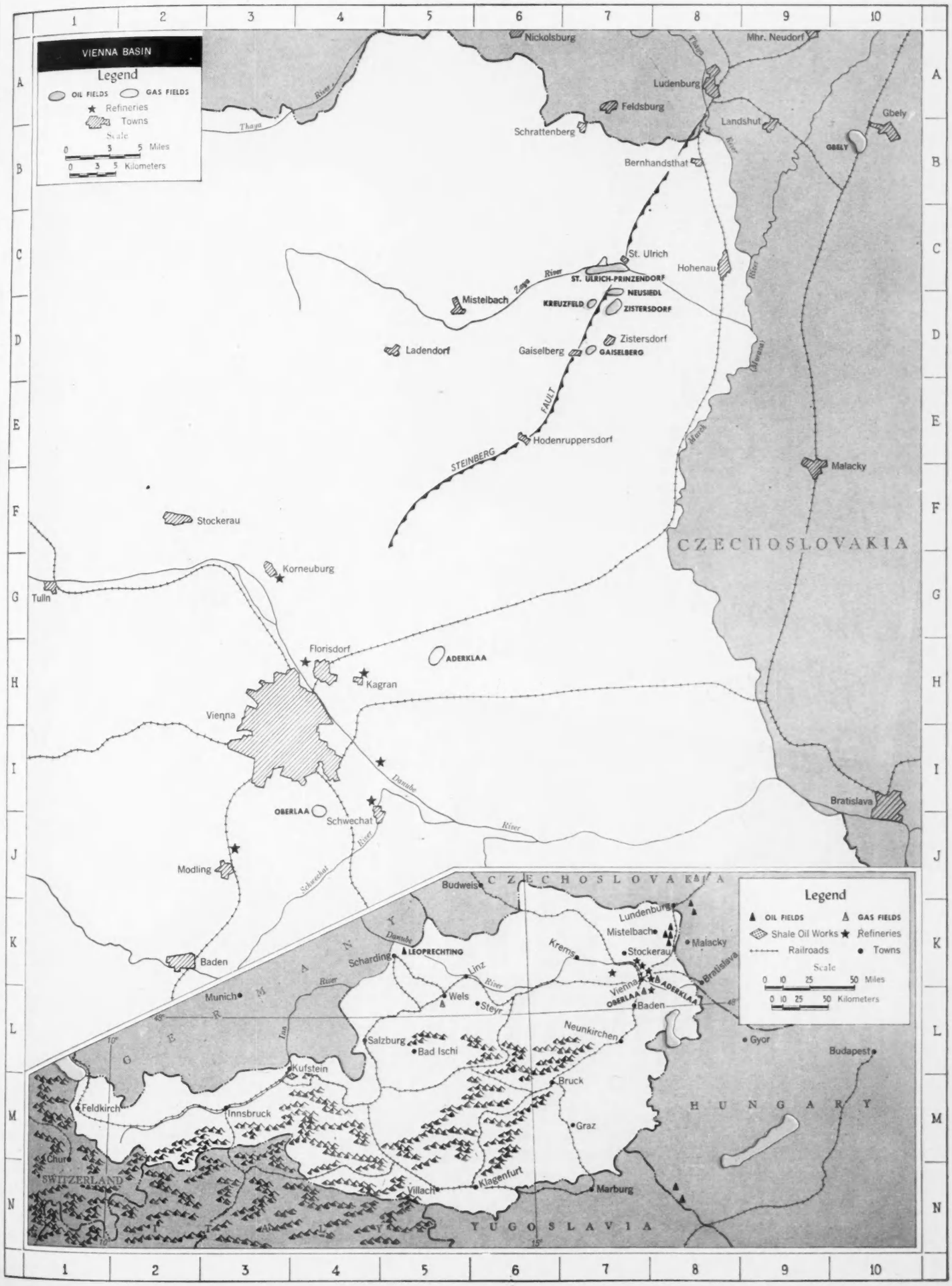
1st Contract with Northern Natural Gas Co.

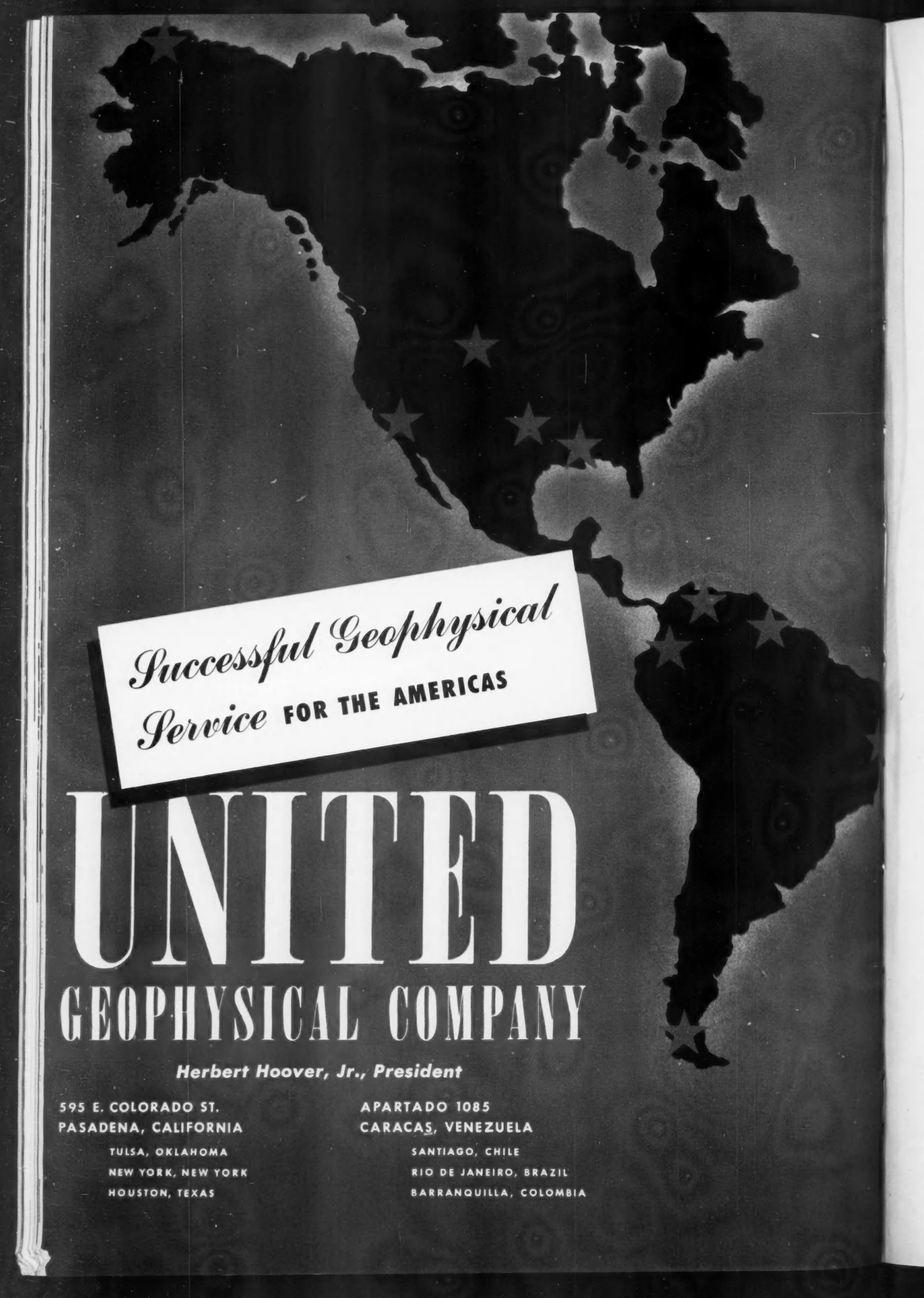
BRITTON & CLARK
CONTRACTING CO.

401-423 N. MAIN ST. • FORT WORTH, TEXAS

AUSTRIA

(International Boundaries as of 1938)




Successful Geophysical
Service FOR THE AMERICAS
UNITED
GEOPHYSICAL COMPANY
Herbert Hoover, Jr., President
595 E. COLORADO ST.
PASADENA, CALIFORNIA
TULSA, OKLAHOMA
NEW YORK, NEW YORK
HOUSTON, TEXAS
APARTADO 1085
CARACAS, VENEZUELA
SANTIAGO, CHILE
RIO DE JANEIRO, BRAZIL
BARRANQUILLA, COLOMBIA

AUSTRIA

PRODUCTION RECORD

ALTHOUGH accurate reports are meager, the development of fields in the Inner Vienna Basin since 1939 has made Austria the third largest oil producing nation in Europe—exceeded only by Russia and Roumania. Much of this development was during German occupation when oil was vital to the Nazis.

Geologists consider a production of approximately 4,422,000 barrels possible in 1946 a sharp decline from 1945's estimated 8,750,000 barrels. The estimated 1946 flow included 4,068,240 barrels of paraffin base crude "P crude," and 353,760 barrels of asphalt base crude "A crude."

VIENNA BASINS

The Inner Vienna basin contains all the commercially important oil and gas producing areas of Austria as well as most of the known oil prospects. The known oil fields are Zistersdorf, Neusiedl, Gaiselberg, St. Ulrich-Prinzendorf, and Kreuzfeld. These producing areas are located along the Steinberg fault, which passes from a point a few miles northeast of Vienna and extends in a north-northeast direction about 30 miles. The fields produce from the Sarmatian and Schlier formations in the Miocene and the Flysch in the Cretaceous.

The prospects in the Inner Vienna basin include Aderklaa and Oberlaa where gas has been produced for several years. Other prospects are Niedersulz, Hohenruppersdorf, Blumenthal, Alt-Lichtenwarth, Windisch-Baumgarten, Obersulz, Enzersdorf, Achau, Probstdorf, Podersdorf, and Eichorn. Most of these structures along the Steinberg fault have received at least one wildcat test and no doubt will be thoroughly tested.

The Outer Vienna basin lies west and north of the inner basin from which it is separated by a narrow fold. All the Pliocene and the upper and middle Miocene formations are absent in the Outer Vienna basin. Prospects include Seefeld and Sokolnice. Some oil has been found in the latter area in the lower Miocene.

Annual Crude Oil Production of Austria by Fields
(In Barrels)

YEAR	Zisters-dorf	Neusiedl	Gaisel-berg	St. Ulrich-Prinzen-dorf	Kreuz-feld	Total Five Fields
Prior to 1939[1]	680,000					680,000
1939	982,763	34,000	162,309	57,800		1,236,872
1940	1,381,080	44,200	1,903,000	48,280		2,476,560
1941	766,020	34,000	1,884,280	37,400		2,721,700
1942	584,800	27,200	2,337,024	850,816		3,799,840
1943	459,000	23,800	2,404,752	4,583,580	345,276	7,816,408
1944	357,680	54,400	1,850,212	6,457,497	1,038,747	9,758,536
Total	5,211,343	217,600	9,641,577	12,035,373	1,384,023	28,489,916

[1] Actual for 1939. Others estimated.

Oil Wells and Oil Production of Austria

Field, Basin	Year of Dis-cov-ery	OIL WELLS AT End of 1944			Crude Oil Production (Barrels)		
		Producing					
		Flow-ing	Art. Lift	Total Pro-ducing	Daily at End of 1944	Year 1944	Cumulative Through 1944
nner Vienna Basin							
Zistersdorf	1930	..	60	60	1,260	357,680	5,211,343
Neusiedl	1939	6	..	6	150	54,400	217,600
Gaiselberg	1938	44	..	44	5,075	1,850,212	9,641,577
St. Ulrich-Prinzendorf	1938	250	..	250	17,695	6,457,497	12,035,373
Kreuzfeld	1943	50	..	50	2,850	1,038,747	1,384,023

OTHER BASINS

The Bavarian basin extends from near Vienna westward into Bavaria. A portion of the basin has been explored for oil and gas structures and favorable areas for oil accumulation have been found at Grieskirchen and Taiskirchen. In the Taufkirchen-Leoprechting area near Scharding, oil was found in granite wash overlaid by the Schlier, the basal formation of the Miocene in this region. Efforts to mine the sands were abandoned. Gas was encountered near Wels while drilling for water. In the Bad Hall area, water was found having iodine and bromide content associated with a seepage of natural gas. The small gas production is being utilized.

The Hungarian basin lies southeast of the Inner Vienna basin from which it is separated by the Little Carpathian mountains. On the Austrian portion of this basin is located the Podersdorf prospect on the east side of Neusiedl Lake. A wildcat in this area encountered traces of gas at 1240 feet. The most important oil fields in Hungary lie in this basin.

Salient Data on Refineries in Austria

Company, Headquarters Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Aktiengesellschaft der Shell Floridsdorfer-mineralolfabrik, Schuberting 14, Vienna 1	Floridsdorf	2,000	750	Skim-Crk.	Operating
Vacuum Oil Co. A. G. (Vienna), Schwarzenbergplatz 18, Vienna	Kargran	2,000	None	Skim	Operating
Nova Oel-Und Brennstoffgesellschaft, A.G. Graben 29, Vienna 1	Schwechat	2,000	None	Skim	Operating
Creditul Minier, Rennweg 25, Vienna 3	Kronenburg	1,000	None	Skim	Operating
Elwerath-Wintershall-I.G. Farbenindustrie groups, Vienna	Lobau	4,000	.....	.....	Building
Donau-Oel-Tank-Lager G. M. B. H., Vienna	Moosbierbaum	2,250	.....	.....	Shut down
Oesterreichische Fanto A. G., Vienna 1	Voesendorf	1,000	.....	.....	Shut down

Engineering and Geological Data on Austria Oil Fields

Field, Basin	Location on Map, Page 187	Proved Area (Acres)	Probable Ultimate Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION					
					Name	Kind	Age	Depths of Wells (Ft.)		Type Structure
								Minimum to Top of Pay	Maximum Total Depth of Wells	
Inner Vienna Basin										
Zistersdorf	D-7	90	90	22	Sarmatian	Sand	Miocene	2788	4828	Fault
Neusiedl	D-7	....	..	33	Flysch	Sand	Cretaceous	3858	4243	Fault
Gaiselberg	D-7	200	..	22	Sarmatian	Sand	Miocene	3590	4475	Fault
St. Ulrich-Prinzendorf	C-7	2,000	..	32.1	Schlier	Sand	Miocene	3095	3205	Fault
Kreuzfeld	D-7	200	..	..	Schlier	Sand	Miocene	2785	....	Pinch-out

IF IT'S A NIXON PRODUCT IT'S NEEDED

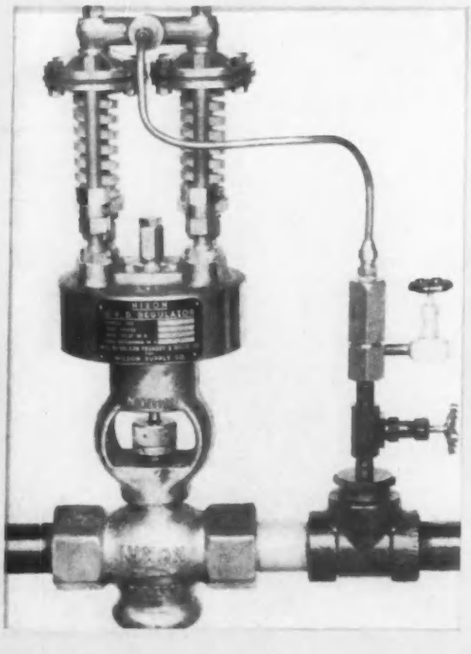
Several thousand Nixon Gas Lifts are now in successful operation—lifting fluid economically and dependably.

Operating fundamentally as a gas displacement pump, the Nixon Gas Lift is applicable to all wells—regardless of depth or volume of fluid to be lifted.

Being a closed system, the Nixon Gas Lift can economically produce several average wells on a lease by the use of a small compressor unit. The Nixon way is the modern way of lifting fluid.

NIXON
Surface Control
GAS LIFT

•



NIXON
Selective Flow Differential
REGULATORS

The Nixon Selective Flow Differential Regulator operates as an automatic motor valve which controls flow of gas or fluid thru a positive funnel shaped choke, located downstream from the Regulator body. The main valve does not throttle—it is either wide open or fully closed.

Highly resistant to freezing, this Regulator eliminates all major regulating problems—also used successfully as a back pressure valve, and as a safety valve on high pressure lines.

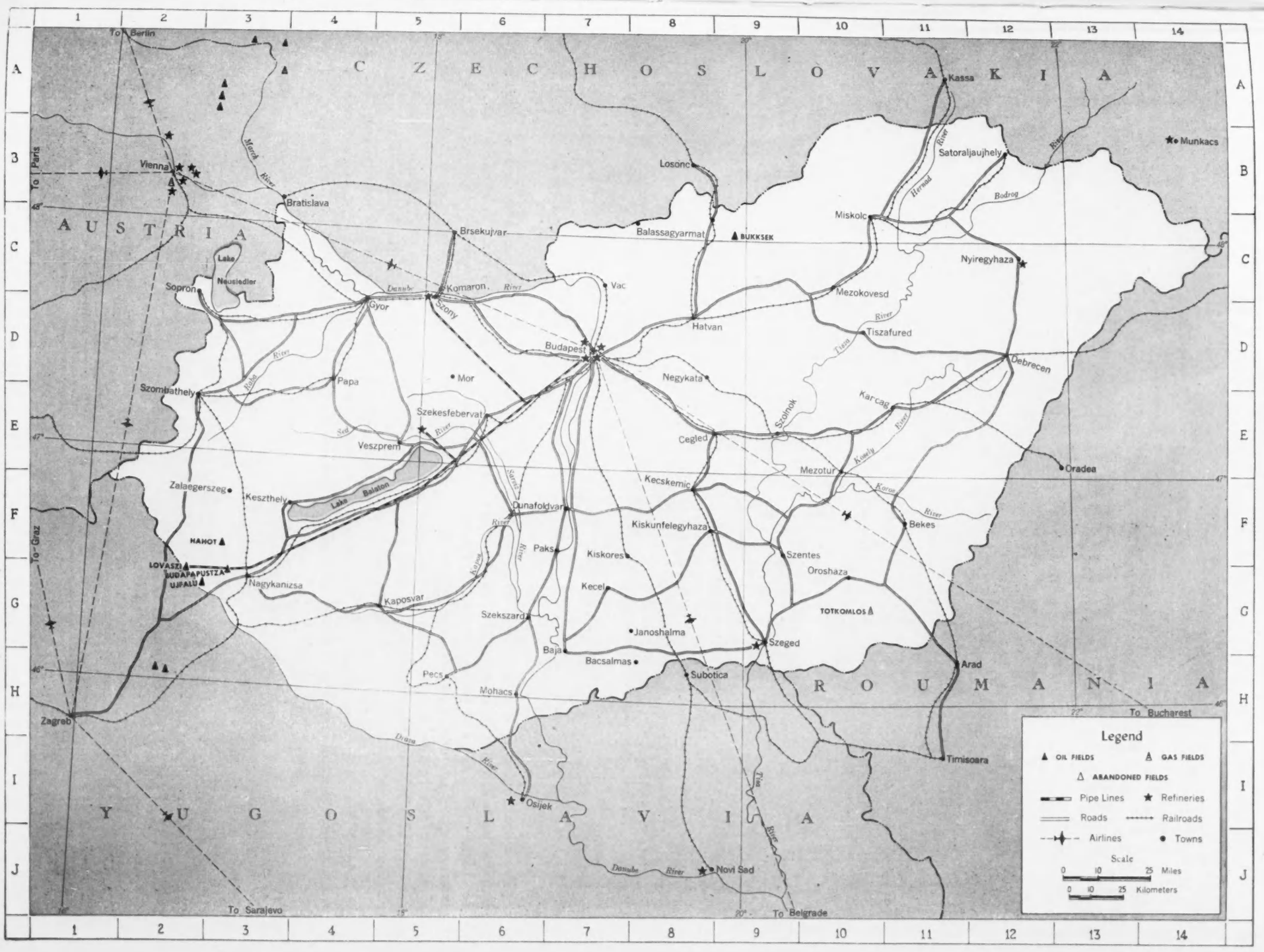
Distributed Internationally by

WILSON SUPPLY COMPANY

1412 MAURY ST., HOUSTON, TEXAS

SALES OFFICES: Tulsa, Oklahoma; Dallas and San Antonio, Texas. LOS ANGELES: Western Pressure Control, 5700 Santa Fe Ave. TRINIDAD, B.W.I., Neal Massey Eng. Corp.

BRANCH STORES: TEXAS — Kilgore, Beaumont, Barbers Hill, Bay City, Monahans, Alice, Victoria, Corpus Christi, Columbus. LOUISIANA — Lake Charles, New Iberia, Harvey, Shreveport. ARKANSAS — Magnolia. MISSISSIPPI — Natchez.



HUNGARY

(International Boundaries as of 1938)

Hit and Miss Regardless of Cost

THESE DAYS ARE GONE

Precision engineering as practiced by OTIS is helping to fulfill the industry's growing demand for higher efficiency and greater economy. Closer tolerances and standard specifications, plus extensive research in the use of alloy steels, have replaced the "hit and miss, regardless of cost" production methods.

Behind these achievements and the OTIS engineering organization, there is a thoroughly modern, war-experienced precision production plant . . . facilities that assure increasingly higher quality and interchangeability of OTIS Sub-Surface tools and their component parts.

These contributions to the oil industry plus a consistent record of reliable field service and counsel have given OTIS full recognition as the foremost leader in the design and manufacture of sub-surface pressure controls.

OTIS PRESSURE CONTROL EQUIPMENT

OTIS PRESSURE CONTROL, INC.

SALES AND SERVICE . . . DALLAS 9, TEXAS

FIELD OFFICES

TEXAS— HOUSTON, CORPUS CHRISTI, AND LONGVIEW
OKLAHOMA— OKLAHOMA CITY NEW MEXICO— HOBBS
LOUISIANA— NEW IBERIA

MANUFACTURE AND DEVELOPMENT

OTIS ENGINEERING CORPORATION

DALLAS, TEXAS

DISTRIBUTORS

OTIS PRESSURE CONTROL, INC., Dallas, Texas
OTIS EASTERN SERVICE, INC. Bradford, Pennsylvania
WESTERN PRESSURE CONTROL. Los Angeles, California

HUNGARY

HISTORY OF PRODUCTION

THE earliest exploration for oil in Hungary was by Anglo-Iranian Oil Company, Ltd., just prior to 1924. The company conducted geological surveys of much of the nation and drilled two dry holes, one on the south flank of Budafapuszta to a depth of 1730 meters (5674 feet) and one east of Kurt to a depth of 622 meters (2040 feet). After these failures the company gave up its concessions.

The government then undertook exploration work and drilled a number of holes. None found oil but several tests found gas and water. About 1936, the government discovered a little oil in the northeast near Bukkszek. Production was at shallow depths (328-656 feet), and proved noncommercial. Many wells were drilled but the maximum production for the field probably never exceeded 20-30 barrels, finally declining to a few barrels daily. There was no pipe line.

Standard Oil Company (New Jersey), through its subsidiary, European Gas and Electric Company, obtained concession on 8 million acres in 1933 and its first test in 1935 on the Mihalyi structure in northwest Hungary made some gas but was abandoned.

In 1936, a test at Gorgeteg, ten miles from the Yugoslav border, was abandoned at 6754 feet after sticking drill pipe. Another test on the Inke anticline, 20 miles south of the western extremity of Lake Balaton, made gas frmo 7073 feet. In February, 1937, a gas well was completed on the Budafapuszta structure with the second well being completed as an oil discovery flowing 365 barrels of 42-gravity oil daily from two sands between 3581-3967 feet. This field now has five producing sands in the Lower Pliocene.

After this discovery, it was necessary for Standard to form an Hungarian company, the Magyar Amerkai Olajipari Reszvenytarasag (Hungarian-American Oil Industries Stock Company). In September, 1940, the company discovered the Lovaszi field, 7 miles northwest of Budafapuszta. The small Ujfalu field was opened in 1941 and the Hahot pool was discovered in 1942.

On December 21, 1941, acting under the Defense Act of 1937, the Hungarian Government took over the operations of MAORT. By this act the titles of the properties remain with the company but the government conducts the operations.

In the latter part of 1940, Hungary granted a concession of 4,725,000 acres in the southeast to a German syndicate (MANAT). Seismic work was started in January, 1942, and the first test, east of the Danube, on the Totkomlos structure, southeast of Szentes, blew out at 5700 feet, spraying oil, from a horizon correlated with the Budafapuszta producing formation. No information is available on other tests here.

The government also has drilled deep tests for gas in eastern Hungary and in the Transylvanian Basin, but results were not announced. Gas production has been developed at Javosbalma.

Estimated reserves in the four known producing areas of Hungary are Budafapuszta, 16,524,443 barrels; Lovaszi, 20,823,665 barrels; Ujfalu, 46,638 barrels; Hahot, 6,203,325 barrels.

Drilling and Producing Wells in Hungary

YEAR	Producing Wells	Footage Drilled	Wells Completed			Wildcats Completed	
			Oil	Gas	Dry	Oil	Dry
1941	103	214,128	38	3	4	1*	2
1942	150	273,916	42	4	6	1†	1
1943	196	292,631	44	2	14	..	2
1944	227	220,522	28	3	7	..	10
1945	237	63,040	10	..	1	..	1

* Ujfalu discovery. † Hahot discovery.

Production by Fields in Hungary
(In Barrels)

YEAR	Budapafuszta	Lovaszi	Ujfalu	Hahot
1941	2,189,405	1,064,707	4,865	.....
1942	2,297,808	2,619,493	3,377	196,477
1943	2,022,600	3,838,363	4,791	559,964
1944	1,709,559	3,810,114	329	684,063
1945	1,540,460	3,122,498	.....	356,171

Engineering and Geological Data on Hungary's Oil Fields

FIELD	Location on Map Page 191	Range of Gravity of Oil (API)	PRODUCING FORMATION			Depths of Wells (Ft.)		Avge. Thickness of Pay (Ft.)
			Name	Kind (Lime, Sand, etc.)	Age	Minimum to Top of Pay	Maximum Total Depth of Wells	
Budafapuszta	G-3	41	Kerettye Budafapuzta Lispe Zala	Sand	Pliocene	3550	4550	26
Bukkszek	C-9	34	.....	....	Oligocene	320	656	..
Lovaszi	G-2	43	Lovaszi	Sand	Pliocene	4950	5400	75
Ujfalu	G-2	..	.....	Sand	Pliocene	....	....	..
Hahot	F-3	..	.....	Limestone	Triassic	....	....	..

Structure is an anticline in each field except Hahot which is a stratigraphic trap.

PIPE LINES

There are three pipe lines known to be operating in Hungary. Vacuum Oil Company has a 125-mile, 8-inch line from the Budafapuszta-Lovaszi area to Budapest. Capacity is about 37,000 barrels daily. A six-inch branch line from the main 8-inch trunk line goes to Szony (Acs). Recently, a 4-inch spur was laid from the Budafapuszta to Budapest line to a small government refinery at Petfurdo.

Hungary Crude Oil and Gasoline Output
(In Barrels)

YEAR	Crude Prod. Daily Average	Casing Gas Prod. Annual
1941	11,437	32,674
1942	16,047	50,155
1943	18,665	111,137
1944	17,124	194,829
1945	14,817	149,887

Data on Refineries in Hungary

Company, Headquarters, Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
Hazai Koolajipar Reszvemutarsaag 5, Nadorutca 7, Budapest	Budapest	1,000	None	Skim-Lube
Nyirbogdanyi Petroleumgyar Reszvemutarsaag, Andrassy-ut 2, Budapest 6	Nyurbogdany	300	None	Skim-Lube
Shell Koolaj Reszvemutarsaag 5 5/6 Jozsef nador ter, Budapest	Budapest-Csepel	3,850	None	Skim-Lube
Fanto Associated Hungarian Oil Co., Ltd., 3/4 Jozsef nador ter. Budapest 5	Budapest	1,100	None	Skim-Lube
Vacuum Oil Co., R. T. ,V. Zrinyiucca 7, Budapest 5	Almasfuzito	3,800	None	Lube-Wax-Asphalt
Magyar Hydrobenzin Reszvemutarsaag, D. Nador-Utca, Budapest	Petfurdo	1,200	350	Skim-Crk
Szoregi Petroleumfabrik, A. G. Jozsef nador ter 8, Budapest 5	Szoregi	420	None	Skim
Magyar Petroleum-Dr. Freund, Budapest	Budapest-Csepel	1,100	None	Skim
Del-Karpati Petroleum	Munkacs	420	None	Skim
Magyar Olaj Muvek	Szony	1,350	None	.....

All plants KNOWN to be operating except the last three listed where information was not available.

REGARDLESS of well depth, fluid level, sand and corrosion conditions, surface equipment, etc., there is an OILMASTER PUMP which will efficiently and economically solve your pumping problems.

Oilmaster Improved Insert Pumps *for Ultra Deep Pumping.*
Oilmaster Volume Producer Pumps } *for Large Volume.*
Oilmaster Full Liner Pumps }
Oilmaster Petrol "A" Pumps *for Stripper Wells.*
Oilmaster Cup Pumps *for Any Well Where Composition Plungers Are Used.*
Oilmaster Multiple Tube Pumps *for Sand Conditions.*

— —PAY OFF FASTER WITH oilmaster

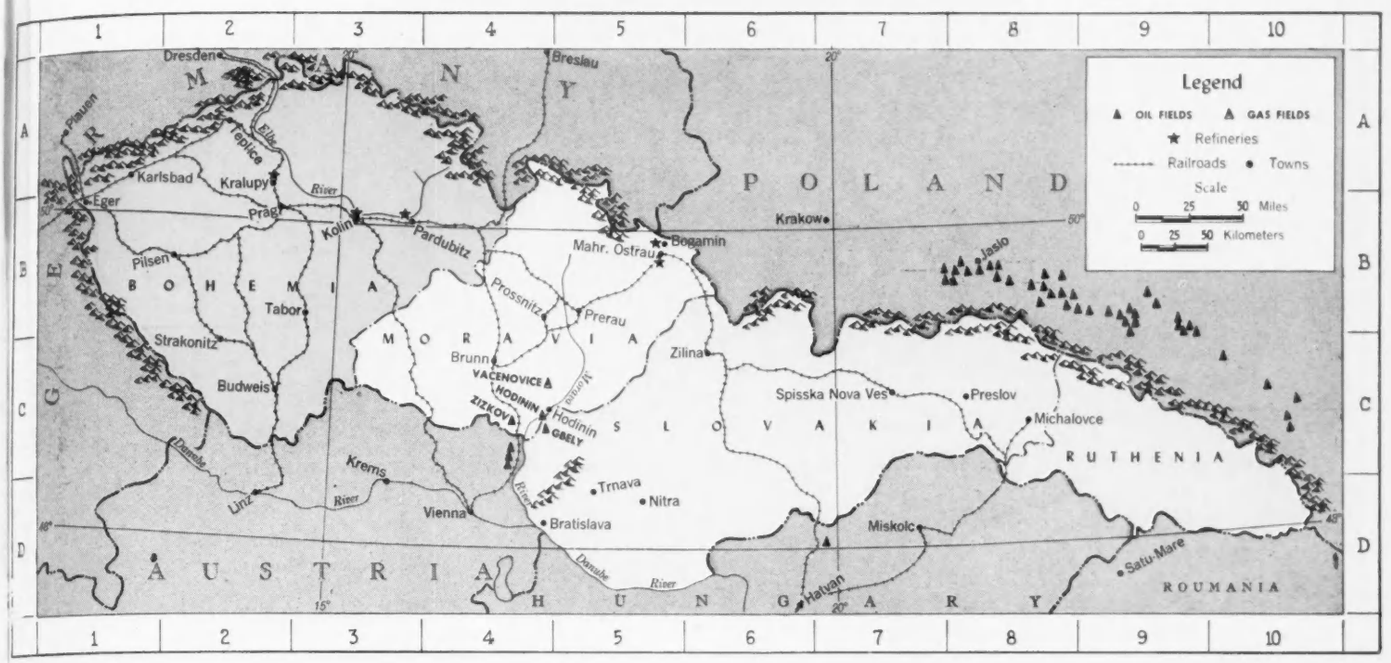
Write for Catalog.

FLUID PACKED PUMP COMPANY
LOS NIETOS, CALIFORNIA
DISTRIBUTED BY THE NATIONAL SUPPLY CO.
EXPORT: THE NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK
CO-DISTRIBUTORS: BERRY SUPPLY STORE, MURRAY TOOL & SUPPLY CO. OF TEXAS, INDUSTRIAL SUPPLY CO.

EPPCO OILMASTER PRODUCTS

CZECHOSLOVAKIA

(International Boundaries as of 1938)



GENERAL INFORMATION

CZECHOSLOVAKIA, one of the minor oil areas to come under Axis control during World War II, has only two known oil pools and one gas field. It is generally believed that these areas were exploited to their fullest capacity during the German occupation but late production figures and drilling information are not available.

Reports from Europe say that the oil industry, as well as other industries in Czechoslovakia, is being nationalized.

PRODUCTION DATA

Oil producing areas in Czechoslovakia are the Hodonin field in Moravia, and the Gbely field in Slovakia. Both fields are in the Vienna Basin, on a trend northeast of the Austrian fields. The Hodonin was discovered in 1919 by Apollo Rafinerie Mineralnich Oleju (Apollo Company). The field is shallow, producing from 425 feet to 485 feet in the Miocene formation with the average thickness of the pay being 65 feet. The structure is defined as a faulted anticline with total proven acreage estimated in 1938 as being 150 acres. The oil is produced from a sand shale and is about 19 gravity (API). The deepest known test to be drilled in the Hondonin field is 2411 feet still in the Miocene.

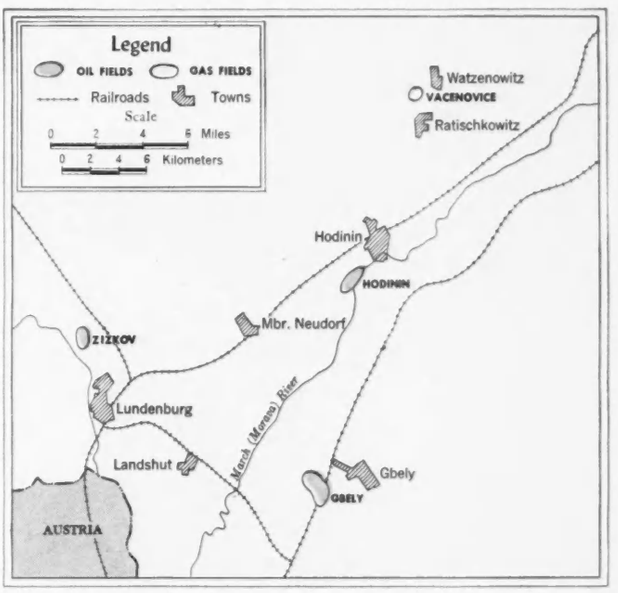
The government-owned Gbley field was discovered in 1913 and is the oldest known producing area in Czechoslovakia. The structure is a faulted anticline with sands producing in the Miocene field. Top of the pay is 540 feet with the bottom being 790 feet. The average thickness of the pay is 100 feet. The field covers approximately 200 acres and the oil produced in the pool is about 21-gravity.

A shallow gas pool was opened in 1929 at Vacenovice (Kyjov), Moravia. The gas was found in the Oligocene.

The latest production figures for Czechoslovakia is 1944 when the annual output was estimated at 247,725 barrels. This compares with an annual production of 191,898 barrels in 1943 and 208,747 barrels in 1942.

Production of natural gas in 1942 was estimated at 4,279,008 cubic feet as against 3,577,083 cubic feet in 1943.

The outcome of an oil-mining project at Sokolnice, near Brno (Brunn), started in December, 1938, is not known.



WILDCATTING

Most of the wildcat drilling in Czechoslovakia during the 1940-45 period was confined to the eastern Ruthenia and north central Slovakia regions. However, there have been no reports concerning any new oil or gas discoveries.

Refineries in Czechoslovakia

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)
Government	Dubowa	600
Apollo Company	Bratislava	1000
Leder-Benzol Verband	Kralupy	400
Vacuum Oil Company	Kolin	600
Fanto Works	Pardubico	1350
Fanto Works	Novy Bohumin (Oderberg)	400
Privozar Mineraloi	Privoz (Moravska Ostrava)	340

. . . for more efficient *Performance*

EQUIP YOUR PUMP WITH ALL MISSION PUMP PARTS . . . .

Put to work for you a team that has been proved by thousands of operators all over the world to speed up drilling by giving long trouble-free service.

MISSION Replaceable Rubber PISTONS are made of tough, durable specially compounded rubber that runs efficiently for extremely long periods. And when they are finally worn, it's simple to install new rubbers on the old piston body at the rig, and you're ready for another long run.

MISSION PISTON RODS combine a core tensile strength of 120,000 pounds with exceptionally high ductility, giving maximum protection against breakage. The exceptional wearing qualities are due to the file-hard surface, plus a super-surfacing which gives 2 to 4 times the wear of ordinary rods.

MISSION Self Sealing GLAND PACKINGS automatically allow pump pressures to adjust packing to correct tightness, insuring a perfect seal on the pressure stroke, and free running on the return stroke—thus saving wear on both packing and rod.

MISSION SLUSH PUMP VALVES have a replaceable bushing which takes the wear instead of the larger, more expensive valve seat New, Compound-308 Inserts last at least twice as long as regular inserts.

ITALY

(International Boundaries as of 1938)

PETOL & TITAN TONGS

"Most Complete Line of Tongs in the World"

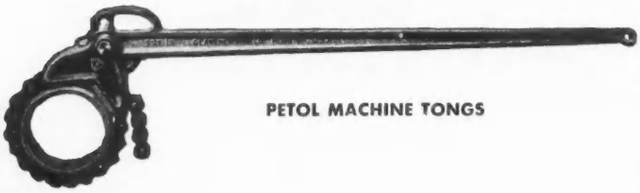
PETOL STABBING TONGS

PETOL HEAVY DUTY TUBING TONGS

TITAN PIPE TONGS

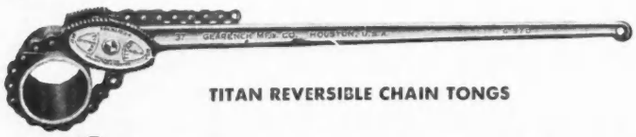
PETOL PIPE TONGS

TITAN CHAIN TONGS



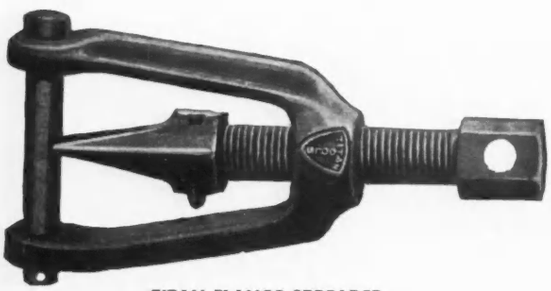
PETOL MACHINE TONGS

PETOL TUBING TONGS



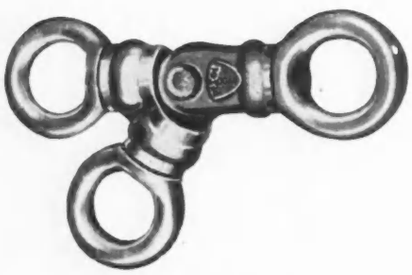
TITAN REVERSIBLE CHAIN TONGS

PETOL FITTING TONGS



TITAN FLANGE SPREADER

PETOL BULL TONGS



PETOL FORKED SPINNING LINE

28 Types

A TYPE FOR EVERY PURPOSE

290 Sizes

A SIZE FOR EVERY REQUIREMENT

WRITE FOR CATALOG NO. 50

PETOL TOOLS — TITAN TOOLS

GEARENCH MFG. COMPANY

HOUSTON, TEXAS, U.S.A.

EXPORT OFFICE: 74 TRINITY PLACE, NEW YORK, N. Y.

ITALY

GENERAL INFORMATION

THE oil fields of Italy are comparatively small and unimportant. Production in the several small areas has been altogether only about 125 barrels per day, the output of wells being measured in many cases in liters. Nearly all of the Italian production is from fields in the north part of the country, in the region of the Po River, between Milan and Bologna. There is no information on recent activity in Italy.

There are three principal producing centers in Italy—Montechino-Velleja, Salsomaggiore and Vallezzo, all in the province of Emilia. The operators are Societa Petroli d'Italia, subsidiary of Standard Oil Company (New Jersey); Regie Terme Bath Company (Italian company), Azienda Generale Italiana Petroli, the government-owned company, and Societa Petrolifera Italiana.

The Montechino-Velleja area is the oldest known oil area in Italy. The first wells were drilled in 1889 by a German syndicate with unsatisfactory results. The concession was given after that to the Marchand Company in 1902, and passed to the Standard (New Jersey) subsidiary in 1906. The field covers about 3000 acres with oil sands found from 100 to 3000 feet. The oil ranges in gravity from 43 to 58 degrees and is produced from the Eocene formation.

The Vallezzo field is located southwest of Parma in the Appenine foothills. Some of the wells in the area are located in what is known as the Monterotondo sector. A seepage of oil at Monterotondo had been known from very early times and was the original cause of development work. Several shallow hand-pits were first sunk to catch the oil. Societa Petrolifera Italiana recovered oil from such a hand-pit in 1907 from a depth of 449 feet. Extension of the field southwestward in 1931 led to the discovery of the main productive series at depths exceeding 1650 feet.

The Salsomaggiore area consists of wells at Salsominore, Salsomaggiore, Monte Cucco, Ferdane, Centopozzi and Rovacchia. First signs of oil were discovered by digging for water in the Cantopozzi area. Societa Petrolifera Italiana drilled the discovery well in 1925 which flowed four barrels of oil with much salt water from a depth of 600 feet. A well drilled by Regie Terme Bath Company in 1932 was completed at 3267 feet as a producer of oil and salt-iodine water.

GEOLOGY

Oil in Italian fields occurs in fractures, or sand lenses, or blocks of sandstone occluded in a very peculiar formation, which the Italians call Argille Scagliose, or scaly shales. The shales are characteristically mottled in bright reds, greens and browns. It is the original heaving shale, as it is highly fluid when wet, and it has been observed to be intruded in joints, bedding planes, and the broken crests of anticlines, much as molten lava would do. The formation is probably of Eocene age, or possibly occupying a transition zone between the Cretaceous and Eocene, although no locality has been found where its upper and lower contact was exposed. Blocks of rock, bigger than the largest buildings, have been observed, being of ages varying from Cretaceous to Pliocene, "floating around" in this sea of mud cocked around at all angles.

Apart from these small oil wels in Emilia, there is a single field with some wells half way between Rome and Naples which has produced some heavy crude.

ASPHALT IN SICILY

At Ragusa in Sicily is located the second largest asphalt deposit in the world; second only to Trinidad Lake, although at Ragusa it occurs in impregnated limestone, something like the deposits near Uvalde, Southwest Texas. The surface appearance in the Ragusa vicinity is somewhat reminisicent of Pecos County, West Texas, and there are untested anticlines of sizable proportions nearby. There are numerous oil and gas seepages in Sicily, nearly all of them associated with the Argille Scagliose. However, no actual oil production has been discovered.

REFINING

Refining operations of crude oil from Albania, Roumania and Germany have been mainly conducted by Azienda Nazionale Idrogenazione Combustibili. When Italy joined Germany in the recent war, the oil enterprises established in Italy by Italian interests of Shell and Anglo-Iranian groups, as well as those of Standard Oil Company (New Jersey), Socony-Vacuum, and The Texas Company were taken over with official approval by the Azienda Generale Italiana Petroli.

Engineering and Geological Data on Italy Oil Fields

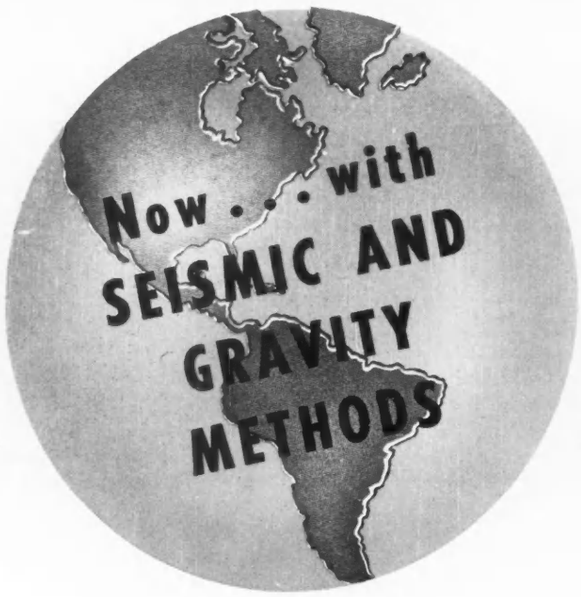
Field, Province	Location on Map Page 199	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION* Age	Depths of Wells (Ft.) Minimum Top Pay	Depths of Wells (Ft.) Maximum Total Depth	Type Structure
Montechino, Emilia	C, D-3	3000	43 to 58	Eocene	100	3000	Anticline, Faulting
Rile Deli Olio, Emilia	C-3	200	46	Mio. Olig.	400	3200	Asymmetrical Anticline, Thrust faults.
Vallezzo, Emilia	D-3	200	52.7	Olig. or U. Eocene	1200	3000	

Note:—* Producing Formation in each field is sands with exception of Vallezo which is sand and marl.

Data on Refineries of Italy

COMPANY	Location of Plant	Crude Charging Capacity, (Bbls. Daily)	Cracking Capacity (Bbls Daily)	Type of Refinery	Operating Status
"Aquila" S.A. Tecnico-Industriale, Casella Postale 82, Trieste	Trieste	6000	None	Skim-Lube	Operating
Azienda Generale Italiana Petroli, Via Tritone 181, Rome	Venice	14,000	3100	Skim-Crk	Operating
Distillazione Italiana Combustibili S.A., San Polo—2004, Venice	Porto Maghera	5000	3500	Skim-Crk	Operating
Raffineria di Olii Minerili (A. G. I. P.) C. Vittorio Emanuele 18, Fiume	Fiume	2500	None	Skim-Lube-Wax	Operating
Azienda Nazionale Idrogenazione Combustibili, Via Principe Umberto 2°, Milan	1. Bari 2. Leghorn	4400 4400	7000 7000	S-C-W-A S-C-W-A	Operating Operating
A. N. I. C. Raffineria de Napoli S.A.I. (Socony-Vacuum) Via Vittorio Veneto 7, Rome	Napies	5500	4000	Skim-Crk	Operating
Societa Petrolifera Italiana, Fornova Taro (Parma), Rome	Fornova	1000	None	Skimming	Operating
Standard Societa Italo Americano del Petrolio, 40 Via Assarotti, Genoa	Trieste S. Sabba	2500	None	Skin-Lube-Asph.	Operating
Societa per Industria Italian del Petrolio (subsidiary of Nafta Societa Italiana del Petroleio ed Affini) Piazza della Vittoria, Genoa	Spezia	12,000	4000	Skim-Crk	Operating

CONDITIONS FAVORABLE TO FINDING NEW OIL . . .



ACCURATELY DETERMINED BY EXPERIENCED CREWS . . . WORKING ON A PLANNED PROGRAM WITH MODERN EQUIPMENT

Our services in locating conditions favorable to finding new oil have been expanded to include experienced *gravity* as well as seismic crews. And you can be sure that they will follow the same theme that has characterized General Geophysical crews for the last decade . . . experienced crews, carrying out a planned program with modern equipment to obtain accurate data which are thoroughly compiled and correctly interpreted.

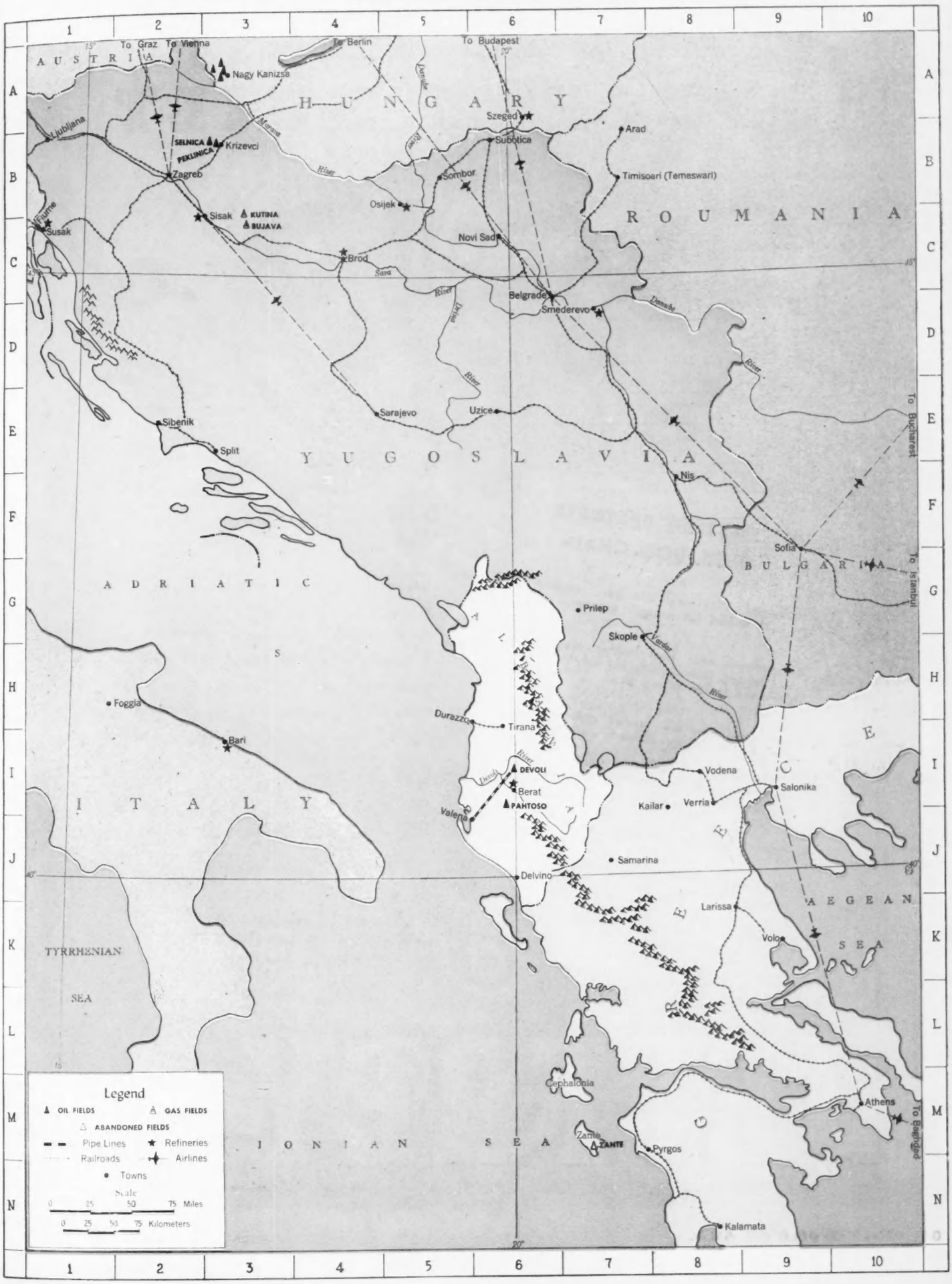
Today, General Geophysical is even better equipped to serve you than during any of its decade of dependable service to the oil industry. Crews are available for work in domestic or foreign fields to conduct accurate geophysical surveys based on proven principles and methods.

When you begin to build-up your backlog of production, build it on data compiled by General crews.

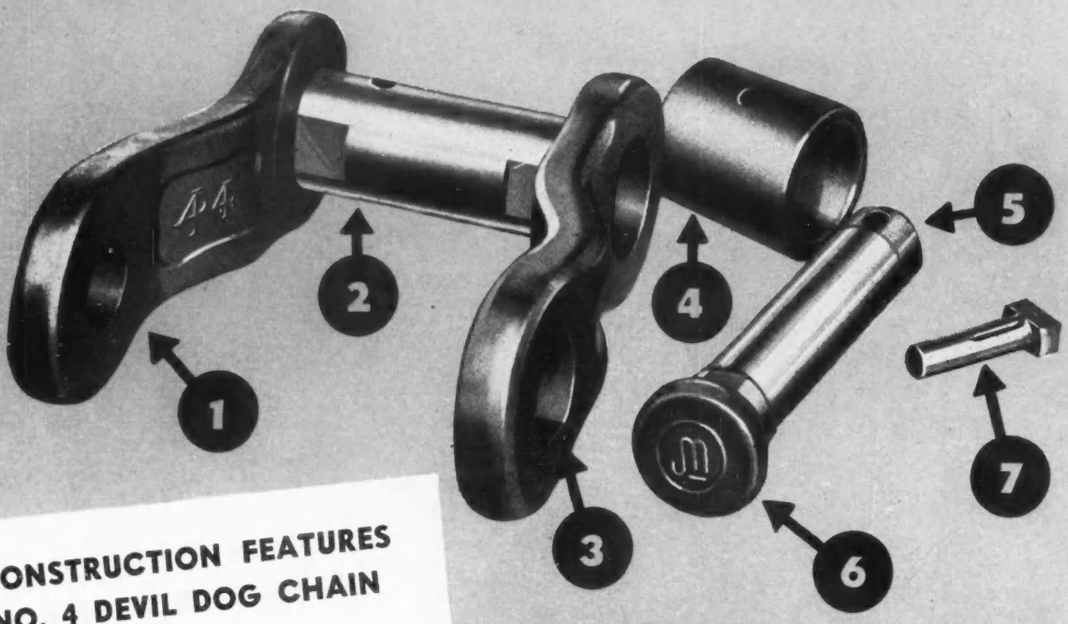
General GEOPHYSICAL COMPANY HOUSTON

YUGOSLAVIA, ALBANIA, GREECE

(International Boundaries as of 1938)



EVERY PART JEFFREY BUILT



CONSTRUCTION FEATURES NO. 4 DEVIL DOG CHAIN

1. Drop-forged Alloy steel side bars, designed and heat treated for strength and toughness.
2. Case-hardened Alloy steel bushing. Machined from solid bar. Ground inside and out. Securely pressed and locked in side bar.
3. Heat-treated pins are pressed and securely locked in side bar by double-D shank.
4. Heat-treated Alloy steel roller. Machined from solid bar.
5. Reduced diameter facilitates assembly.
6. Pin-Alloy steel, heat-treated for maximum hardness and toughness. Centerless ground.
7. Solid cotter pin. High carbon steel, heat treated for toughness.

Whether drilling shallow or deep, in hard or easy going, you will find it money-saving practice ALWAYS to use a better class of chains, such as the Jeffrey Devil Dog series. Plus-values derived by discriminating selection of alloy steels, balanced construction without excess weight and PRECISION MANUFACTURE. This means "broken-in" chain at the factory, resulting in less subsequent stretch and wear.

To conserve manpower, Jeffrey chains will not have the usual boxing for the duration.

Send for Catalog No. 708-A

JEFFREY

ESTABLISHED 1877

THE JEFFREY MANUFACTURING COMPANY, 985-99 North Fourth Street, Columbus 16, Ohio

ALBANIA, YUGOSLAVIA, GREECE

GENERAL INFORMATION

VERY little information has been received concerning recent activities in the oil industry of Yugoslavia, Greece and Albania. In each country there is one known oil producing district but total production of all three nations is minor with the crude oil that is produced being of poor quality.

There has been no information released concerning the drilling of new wells in the countries, indicating that this phase of the information has been more or less dormant. Principal activity since the end of the war has been pointed to restoration and expansion of the refining capacity in each country.

ALBANIA

Of the three countries, Albania is the scene of some activity and the site of the most important oil producing area.

While oil production has been obtained elsewhere in Albania, the only production of consequence is in the Devoli district consisting of about five separate producing areas (I-6 on map, page 203). The Devoli fields are located in the triangle formed by the union of the Devoli and Semeni rivers, a few miles north of the town of Berat. The district covers approximately 1730 acres and recoverable reserves at one time were estimated at 80 million barrels.

The fields produce from the Upper Miocene formation between 1640 and 2620 feet. The oil is about 16 gravity.

Albania's oil production in 1943 was estimated at 3700 barrels daily from about 550 wells, equivalent to about 7 barrels of oil daily per well. Reports say that the production reached 200,000 metric tons (1,334,400 barrels) annually under Italian occupation. Oil produced at Devoli is transported through an 8-inch, 46-mile pipe line to the port of Valona. The government operates a small skimming plant at Berat. Capacity of the plant is estimated at 750 barrels daily.

All foreign companies and enterprises established in Albania before or during the Italian occupation have been taken over by the Albanian government and placed under the administration of a special commission. These properties include the Mussolini-sponsored Agenzia Italiana Petroli Albania, a subsidiary of the Italian group AGIP. The prospecting rights held by AGIP in Albania covered approximately 2,980,000 acres.

The government oil organization has already begun to export various petroleum products to Yugoslavia. About 20 percent of the Albanian state expenditure for 1945-46 is expected to be met from proceeds of domestic and foreign oil trade.

Prior to the war the oil reserves of the Devoli fields were estimated at about 85 million barrels. Present production is estimated at not more than 300 barrels daily and the government oil organization is endeavoring to increase this output by 50 percent.

Production of bitumen for macadamizing roads is beginning to show an increase. However, present production of bitumen is estimated at four tons daily.

YUGOSLAVIA

Although actual oil production in Yugoslavia is very small, current reports indicate that wildcat drilling and development of old areas is increasing.

Crude oil is produced in the Peklenco-Selencia district near the border of Austria-Hungary (B-3 on map, page 203). This area was discovered during the German occupation with production reaching more than 600 barrels daily from about six wells. The wells reportedly produce from the Devonian formation around 4000-4200 feet. It is possible that this oil district is much larger than indicated above and that the Peklenco-Selencia discovery has opened new possibilities for oil exploration in Yugoslavia. There have been reports that shows of asphalt have been located near the coast and will be exploited.

Natural gas is produced in the Bujavica-Kutina area, about 60 miles east of Zagreb (C-3 on map). Reports say that 1944 production totaled 229,560,500 cubic feet of natural gas. This peak production was reached during German occupation. A pipe line was built in 1939-1940 from Kutina to Zagreb. There also is a carbon black plant located at Kutina burning the methane gas.

Four refineries are reported operating in Yugoslavia with a total capacity of about 5800 barrels daily. These plants are Standard-Vacuum at Brosanski Brod; Shell at Caprag, Ivanovic & Company at Osijek, and Sumadiska Kreditava at Smederevo. (See accompanying table.)

GREECE

The only known area in Greece to produce crude oil is the Zante field on the southwest coast of the Island of Zante in Keri Parish (M-7 on map, page 203). The existence of petroleum at Zante was known to the ancient Greeks and was first mentioned by Herodotus in 484 B.C. First research work started in 1866 and various companies have at times undertaken to drill to shallow depths. In this early development 10 tests reached depths averaging about 46 feet. The maximum depth reached in any of these early tests was about 115 feet.

Various layers of heavy crude oil were found between the surface and the greatest depth reached, in both the Pliocene and Miocene strata. Modern drilling began in 1927 and renewed in 1933 when the Greek government granted a concession to D. Kolaitis. This drilling resulted in the discovery of oil in the Keri area.

Producing formations include dolomite, clay, sand, shale and gypsum. The deepest hole drilled was to 260 feet in gravel sand. The peak annual production did not exceed 3500 barrels. All work in the Zante district was halted in 1939.

Exploration work on the mainland of Greece was started shortly before the war by United States interests but was abandoned with the equipment being taken by the Italians and Germans.

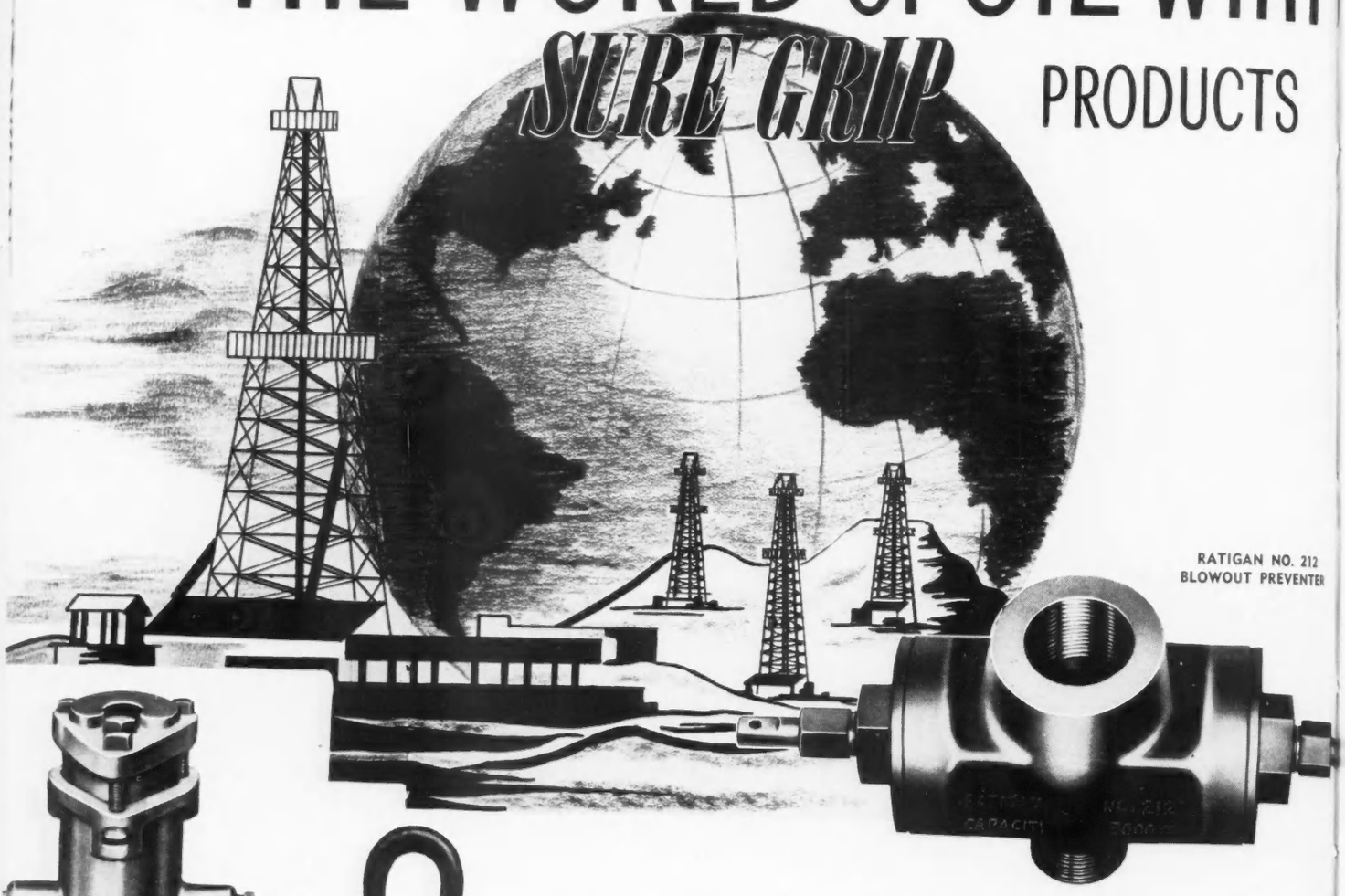
Reports in 1945 declared that the Greek government had decreed that oil be declared a national product and it is expected that the petroleum industry in Greece will become nationalized.

Data on Refineries of Yugoslavia and Albania

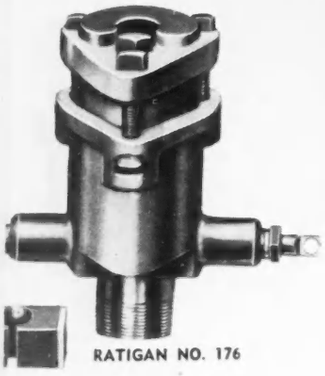
COMPANY	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery	Operating Status
Yugoslavia					
Standard-Vacuum Oil of Yugoslavia, Inc., Brod	Brosanski Brod	2,250	None	Lube-Wax	Operating
Shell Oil Co. of Jugoslavia, Ltd., Gajeva ul. 5, Zagreb	Caprag	2,000	None	Skimming	Operating
Ivanovic & Co., Osijek	Osijek	550	None	Skimming	Operating
Sumadiska Kreditava	Smederevo	1,000	None	Skimming	.....
Albania					
Albanian Government	Berat	750	None	Skimming	Operating

Serving

THE WORLD of OIL with *SURE GRIP* PRODUCTS



RATIGAN NO. 212
BLOWOUT PREVENTER



RATIGAN NO. 176
STUFFING BOX

RATIGAN NO. 204
POLISH ROD GRIP

Ratigan "Sure Grip" Products have been used throughout the world for many years in the continuous search for oil. These products are well known for their high quality material, fine workmanship, rugged durability and efficient performance.

Continuous development of new methods and improvements is a definite part of our policy to manufacture the best tools possible to produce. As a direct result of this policy, Ratigan "Sure Grip" Products are recognized everywhere as the leaders in their field.

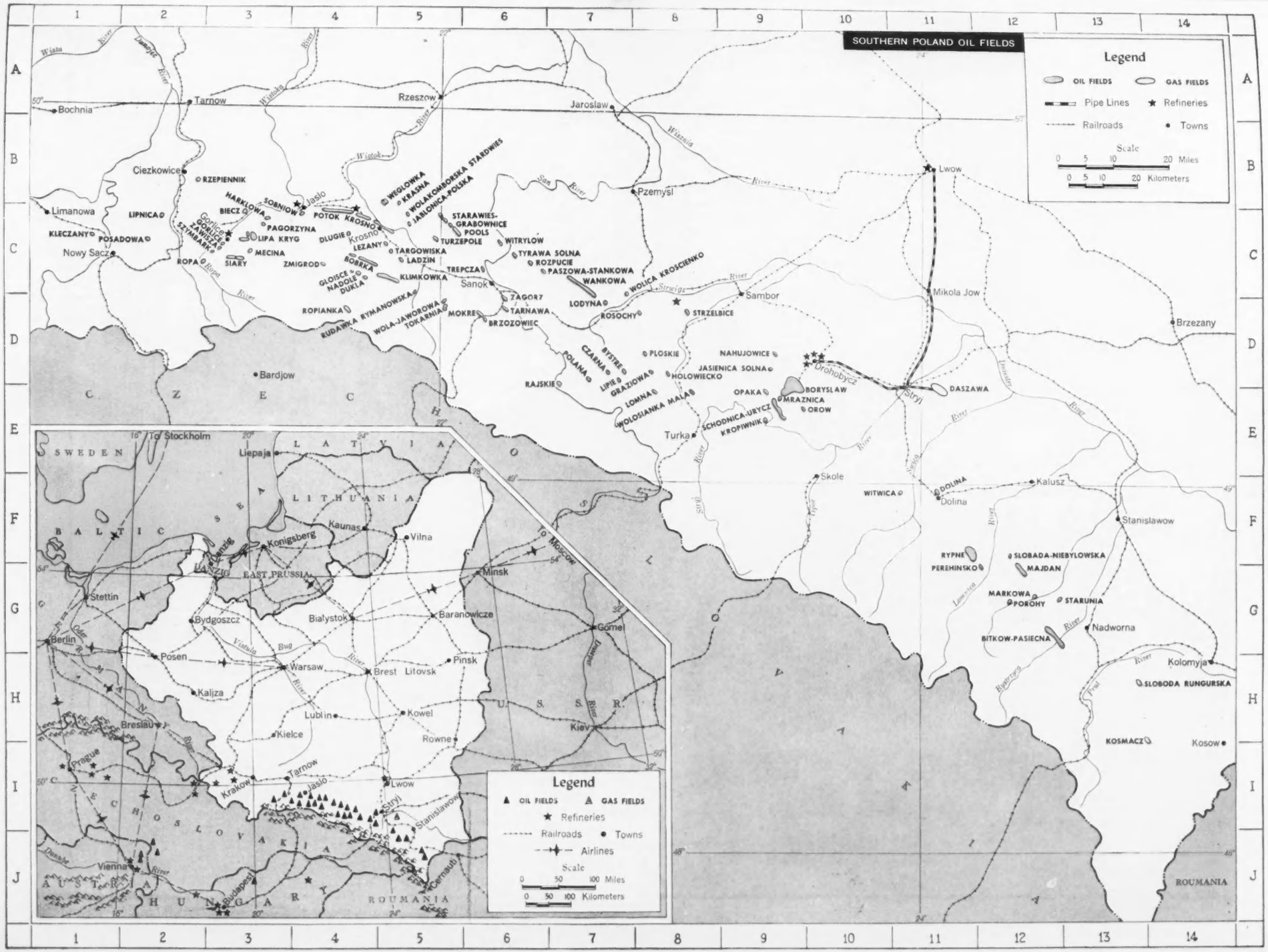
The purchase of Ratigan "Sure Grip" Products is your assurance of economical, dependable performance.

RATIGAN *Sure Grip* PRODUCTS

OIL-LESS BEAM HANGERS AND ROD HANGERS
POLISH ROD GRIPS AND CLAMPS
SPRING SUCKER ROD HOOKS
SUCKER ROD ELEVATORS
SPRING SWIVEL LINKS AND "C" LINKS
OIL-LESS BEAM ROCKERS AND STIRRUP BEARINGS
STUFFING BOXES — HORSEHEADS
TUBING TONGS
ROD WRENCHES AND COUPLING WRENCHES
TUBING BLOCK CLAMPS — BELL NIPPLES
SHOCK ABSORBERS — STRINGING-UP LINKS
ADJUSTABLE SUCKER ROD LINE WEIGHTS
ROD STRIPPING COMBINATION BELL NIPPLES

J. P. RATIGAN

1213 Santa Fe Avenue — Los Angeles 21, California


SOUTHERN POLAND OIL FIELDS
Legend
OIL FIELDS
GAS FIELDS
Pipe Lines
Refineries
Railroads
Towns
Scale
0 5 10 20 Miles
0 5 10 20 Kilometers
POLAND
(International Boundaries as of 1938)
Bochnia
Tarnow
Rzeszow
Jaroslaw
Lwow
Przemysl
Sambor
Mikola Jow
Brzezany
Stryj
Drohobycz
Skole
Turka
Dolina
Kalusz
Stanislawow
Nadworna
Kolomyja
Ciezkowice
RZEPIENNIK
Limanowa
LIPNICA
KLECZANY
POSADOWA
Nowy Sacz
HARKLOWA
BIECZ
SOBNIOW
Jaslo
POTOK
Krosno
PAGORZYNA
LIPA KRYG
MECINA
SIARY
ROPA
ZMIGROD
DLUGIE
LEZANY
TARGOWISKA
LADZIN
BOBRKA
GLOSCE
NADOLE
DUKLA
KLIMKOWKA
TREPCZA
Sanok
ROPIANKA
RUDAWKA RYMANOWSKA
WOLA-JAWOROWA
TOKARNIA
MOKRE
BRZOZOWIEC
ZAGORZ
TARNAWA
LODYNA
ROSOCHY
STRZELBICE
WEGLOWKA
KRASNA
WOLAKOMBORSKA STARDWIES
JABLONICA-POLSKA
STAROWIES-GRABOWNICE POOLS
TURZEPOLE
WITRYLOW
TYRAWA SOLNA
ROZPUCIE
PASZOWA-STANKOWA
WANKOWA
WOLICA KROSCIENKO
PLOSKIE
NAHUJOWICE
JASIENICA SOLNA
HOLOWIECKO
OPAKA
BORYSLAW
MRAZNICA
OROW
DASZAWA
SCHODNICA-URYCZ
KROPIWNIK
WITWICA
DOLINA
RYPNE
PEREHINSKO
SLOBADA-NIEBYLOWSKA
MAJDAN
MARKOWA
POROHY
STARUNIA
BITKOW-PASIECNA
SLOBODA RUNGURSKA
KOSMACZ
Kosow
RAJSKIE
POLANA
CZARNA
BYSTRE
LIPIE
GRAZIOWA
LOMNA
WOLOSIANKA MALA
ROUMANIA
Bardjow
C Z E C H
To Stockholm
SWEDEN
Liepaja
L A T V I A
LITHUANIA
B A L T I C S E A
Kaunas
Vilna
Konigsberg
DANZIG
EAST PRUSSIA
To Moscow
Minsk
Stettin
Bydgoszcz
Bialystok
Baranowicz
Gomel
Berlin
Posen
Warsaw
Brest Litovsk
Pinsk
Kaliza
Lublin
Kowel
Kielce
Rowne
Kiev
U. S. S. R.
Breslau
Prague
Krakow
Tarnow
Jaslo
Lwow
Stryj
Stanislawow
Vienna
Budapest
Cernauti
AUSTRIA
HUNGARY
CZECHOSLOVAKIA
ROUMANIA
Legend
OIL FIELDS
GAS FIELDS
Refineries
Railroads
Towns
Airlines
Scale
0 50 100 Miles
0 50 100 Kilometers

PIPE

YOUNGSTOWN SHEET AND TUBE COMPANY

Casing, Tubing, Drill Pipe, Line Pipe,
Seamless, Electricweld, Lapweld, Continuousweld

What's Behind the Trade Mark?
OIL COUNTRY TUBULAR GOODS
TRADE MARK
YOUNGSTOWN

B.&W. TUBES

BABCOCK AND WILCOX TUBE COMPANY

Cracking Still, Heat Exchange, Condenser and Boiler Tubes,
Seamless, Electricweld, Carbon and Alloy Steel

TSCo

SUPPLIES and EQUIPMENT

- Tool Joints
- Rock Bits
- Valves
- Float Equipment
- Christmas Tree Hookups
- Casing and Tubing Heads
- Sucker Rods, Pony Rods and Pull Rods
- Pumping Equipment

COMPETENT, COURTEOUS, EFFICIENT SERVICE IS A PERSONAL MATTER WITH—

TSCo

TEXOMA SUPPLY CO.

CARL J. HOCHENAUER, PRESIDENT

GENERAL OFFICES TULSA, OKLAHOMA

POLAND

POLAND OIL PRODUCTION

VERY little improvement in crude oil production in Poland has yet resulted from efforts made in recent months in those oil producing areas remaining inside Poland after that nation accepted the Curzon Line as a new frontier. Part of the oil fields in eastern Poland were located in the territory grabbed by the Soviet Union.

Poland's oil production dates back to 1874 when annual output was estimated at 150,000 barrels. The oil came from shallow oil seepages in the Eocene and Cretaceous formations. The peak oil production year was in 1909 when the annual flow reached 14,933,000 barrels. Since that time it has shown a steady decline. At the outbreak of the war in September, 1939, Poland had 27 fields with about 3822 wells and the annual production was estimated at 3,898,000 barrels. Thirteen of the fields, with 1646 wells, were in Jaslo and were taken over by Germany. The remaining fields in Drohobycz and Stanislawow, were taken over by the Russians.

The country now is attempting to exploit new fields to augment her present annual production of about 120,000 tons (890,280 barrels) or about 35 percent of the 1939 level. Recent reports say that ten new wells are being drilled near Cracow, in Pomerania, in the Poznan area, and in Kiezeckie. Drilling in August, 1945, is reported to have amounted to 5600 feet, a 50 percent gain over July, 1945.

Engineering and Geological Data on Poland Oil Fields

Field and Area	Location on Map Page 207	Year Discovered	Gravity of Oil (API)	PRODUCING FORMATION		
				Age	Depth of Wells (Ft.)	Type Structure
Drohobycz Area						
Borysław	D-9	1894	31–36	Olig. (Eoc. Cre.)	4270–5700	Folds
Daszawa (Gas)	D-11	1921		Mio	2330	Anticline
Lodyna	C-7	1888	39–39	Olig.	1150–1900	Diapiric fold
Nahujowica	D-9	1892	19.8	Olig. Eoc.	535– 656	Anticline
Opaka	E-9	1896	43	Eoc.	1970	Anticline
Orow	E-9	1891	25.7	Cre.	300–1835	Irregularily folded rocks
Wankowa	C-7	1885	31–36	Olig.	2460–2625	Diap. fold
Polana	D-7	1880	35	Olig.	325– 685	Anticline
Rajskie	D-7	1883	48.5	Olig.	980–1300	Unsym. fold
Rypne	F-11	1887	37	Olig.	500–3700	Fold
Schodnica-Uryez	E-9	1872	36	Cre.	1480	Anticline
Strzelbice	D-8	1881	32	Cre.	660	Anticline
Zagorz	D-6	1885	24.5	Olig.	1160–2338	Anticline
Jaslo Area						
Biecz	C-3	1897	39	Eco.	480–1440	Diap. fold
Bobrka	C-4	1858	34	Eoc. Cre.	480–3200	Anticline
Gorlice	C-3	1931	35	Olig.	360–1450	Unsym. fold
Harklowa-Pagorzyna	C-3	1870	27	Olig.	720	Overthrust
Klimkowka	C-5	1890	29.3	Olig.	450–2400	Anticline
Kleczany	C-1	1858	31–50	Cre.	300–1600	Unsym. fold
Lipa-Kryg	C-3	1865	34	Eoc. Cre.	500–2500	Anticline
Krosno	C-4	1888	32	Eoc.	900–2000	Diap. fold
Mecina	C-3	1909	42	Eoc. Cre.	2400–4160	Diap. fold
Mokre	D-6	1914	35–45	Olig.	650–1800	Anticline
Potok-Krosno		1891	39–51	Eoc. Cre.	416–1120	Diap.
Ropianko	D-4	1868	31	Cre.	390–1120	Anticline
Rudawka-Rymanowska	C-5	1899	36.3	Olig.	1200–3150	Anticline
Rzepiennik	B-2	1930	39.6	Cre.	1410	Anticline
Siary	C-3	1875	35	Eoc. Cre.	500–1000	Anticline
Starawies-Grabownica	C-5	1896	37–47	Eoc. Cre.	650–3300	Diap.
Tokarnia-Wola Jaworowa	D-5	1894	35.5	Olig.	350– 785	Unsym. fold
Tyrawa-Solna	C-6	1897	35	Olig.	330– 350	Narrow fold
Weglowka	B-5	1887	27–30	Cre.	250–1500	Anticline
Witrylow	C-6	1880	42.8	Eoc. Cre.	350–1200	Narrow fold
Turzepole	C-5	1896	33	Eoc.	1480	Anticline
Stanislawow Area						
Bitkow	G-12	1899	44	Olig.	3610	Anticline
Sloboda-Rungurska	H-13	1875	37	Cre.	400–1000	Anticline
Kosmacz	H-13	1900	32	Cre.	1920	Anticline
Majdan	F-12	1889	29–37	Eoc.	590–1650	Anticline

NATIONALIZATION OF INDUSTRY

On January 3, 1946, the Polish provisional government approved her nationalization-of-industry law. This decree included the oil industry. Efforts of the State Department of the United States to insure that American owners of property taken over by the Polish government under the naturalization law shall be compensated have been temporarily suspended as a result of Polish representations that no negotiations can be undertaken until after issuance of numerous orders and regulations implementing the naturalization law.

Assurances have been given, however, that United States citizens who believe themselves affected by the law will receive compensation on an equal basis with Polish citizens.

Meantime, the government formed a new Oil Industry Research Institute in Cracow and under the Institute's auspices several tests will be drilled in the Mielec district. Polish geologists have also carried out extensive research work near Zywiec and over the whole eastern range of the Carpathian foothills in the vicinity of Brzezowa, Brzeska and Bochnia, located between Cracow and Tarnov.

GAS INDUSTRY

Up to the end of World War 1, gas was derived only from oil. In 1917 a pure gas stratum was opened near Jaslo, and from that time on a number of gas wells in exploitation steadily increased. New deposits were discovered near Stryj, Drohobycz, Kalusz and Przemysl, and discoveries already made indicate that they are great throughout this area, parallel to the oil-bearing zone in the foothills of the Carpathian Mountains.

In 1920 the total production of gas amounted to 405 million cubic meters and reached 584 million cubic meters in 1938. About one-half of the gas produced supplied mines and refineries, and the other half was used in lighting and heating towns and in the production of electricity. In 1935 there were 186 gas wells in exploitation in Poland. Before the war 29 natural gas purifying plants were in the country.

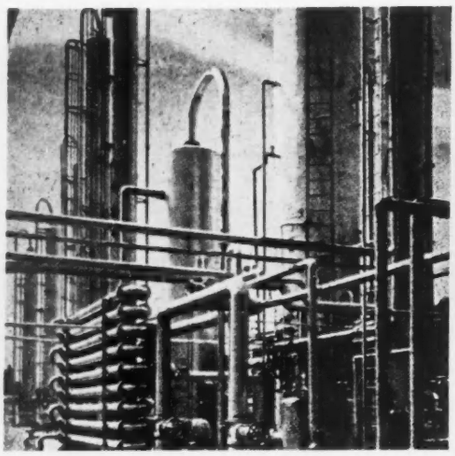
However, Poland's gas industry was also a war casualty with present production only about 14,800,000 cubic feet.

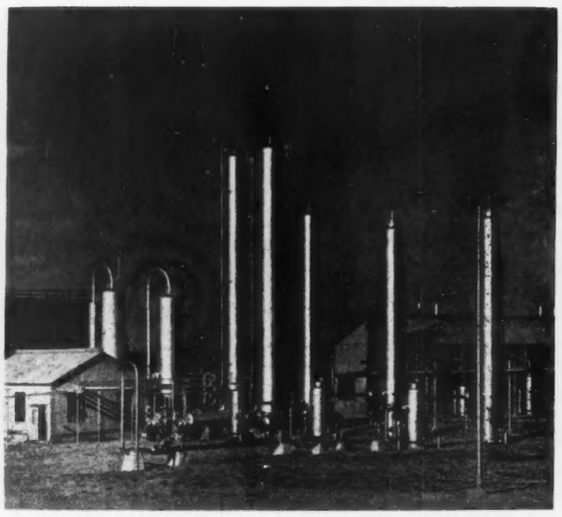
Data on Refineries of Poland

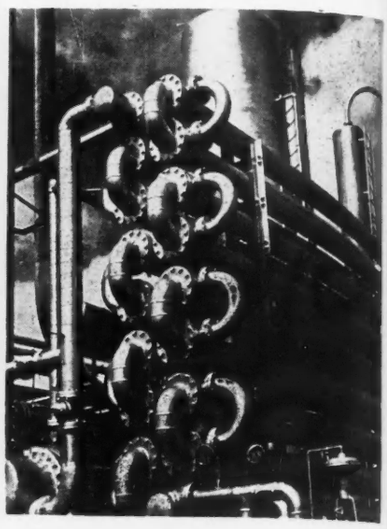
Company, Headquarters Address	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery
Galicyj-ski Towarzystwo Naftowe "Galicja" S.A., 26 Batorego, Pl. Marjacke 8, Lwow	Drohobycz	3,000	1,000	Complete
Galizische Karpathen Pet. A. G. 26 Batorego, Pl. Marjacke 8, Lwow	Jedlice	1,200	None	Skim-Lube
	Dziedzice	1,200	None	Skim-Lube
"Gazy Ziemme" Spolka Akcyjna dla Przemyslu Naftowego I Gazow Zem, Akademick 7, Lwow	Zniesienie, N. Lwow	1,000	None	Skim-Lube
"Nafta" Spolka Akcyjna, 26 Batorego Pl. Marjacke 8, Lwow	Drohobycz	1,200	None	Skim-Lube
Jaslo, Industrial Oil Works, Nieglowice ad Jaslo, Jaslo	Nieglowice	1,500	None	Skim-Lube
"Limanowa" Towarzystwo Naftowe Spolka Z. Org. Odp., Borysław	Limanowa	2,000	None	S-L-Asphalt
"Polmin" State Oil Works, Akademicj 7, Lwow	Drohobycz	3,500	1,000	S-C-L
Polskie Zwiazkowe Refiner je Alejow Skanych (Polish United Oil Refineries) 25, Batorego, Pl. Marjacke, Lwow	Rychcice, Drohobycz	800	None	Skim-Lube
	Trzebinia (Cracow)	1,500	None	Skim-Lube
Rafinerja Nafty "Gleboka" Spolka Z.O.O., Gelboka	Gleboka (Sambor)	100	None	Skimming
Rafinerja Nafty Fabryka Olejow, Maszynowych M. H. Reich 1, Ska, Stryj	Stryj	250	None	Skim
Rafinerja Skawinska Zaklady Dia Premyslu Oleju Skalnego, Griffel 1 Ska, Skawina	Skawina	300	None	Skim
Spolka Akcyjna Fanto, Pl. Maryacki 8, Lwow	Ustrzyki Dolne	1,000	None	Skimming
Standard Nobel Co. in Poland, Ltd., Warsaw	Libusza	1,200	None	Skim-Lube
Vacuum Oil Vo., S.A., Post-Dziedzice, Warsaw	Czechowice, Silesia	1,600	300	S-L-Wax
Rafinerja Olejow Mineralnych "Segli" Spolka, Nadworna	Nadworna	200	None	Skim
Stawiarski, R. W. & Co., Krosno	Krosno	500	None	Skim

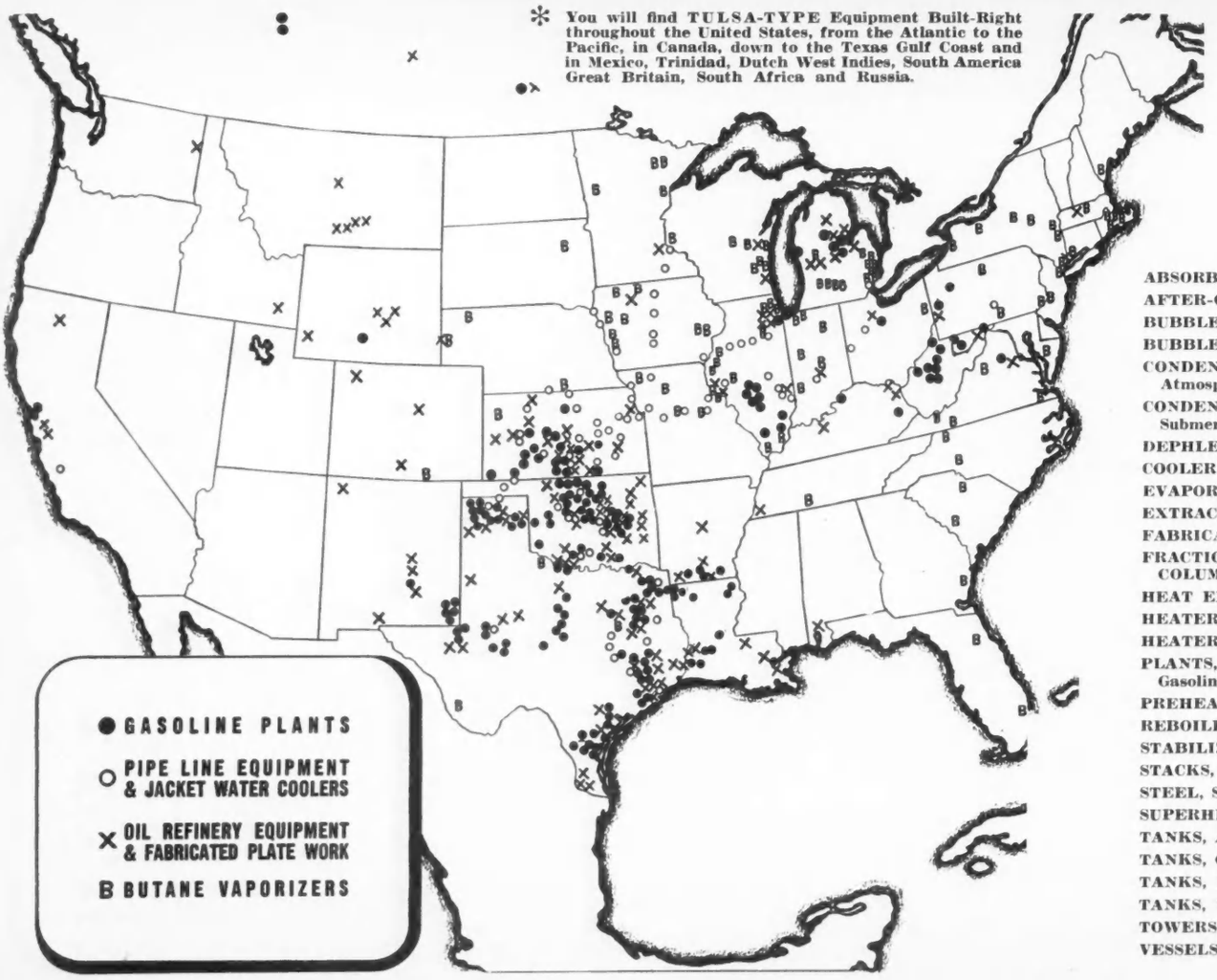
TULSA TYPE Natural Gasoline Plant and Refinery Equipment

IN WORLD-WIDE USE








● GASOLINE PLANTS
○ PIPE LINE EQUIPMENT & JACKET WATER COOLERS
× OIL REFINERY EQUIPMENT & FABRICATED PLATE WORK
B BUTANE VAPORIZERS

✻ You will find TULSA-TYPE Equipment Built-Right throughout the United States, from the Atlantic to the Pacific, in Canada, down to the Texas Gulf Coast and in Mexico, Trinidad, Dutch West Indies, South America Great Britain, South Africa and Russia.

ABSORBERS
AFTER-COOLERS
BUBBLE TRAYS
BUBBLE CAPS
CONDENSERS, Atmospheric
CONDENSERS, Submerged
DEPHLEGMATORS
COOLERS, Gas
EVAPORATORS
EXTRACTORS, Mist
FABRICATED STEEL
FRACTIONATING COLUMNS
HEAT EXCHANGERS
HEATERS, Feed Water
HEATERS, Storage Tank
PLANTS, Natural Gasoline
PREHEATERS
REBOILERS
STABILIZERS
STACKS, Steel
STEEL, Structural
SUPERHEATERS, Steam
TANKS, Air
TANKS, Chemical
TANKS, Pressure Storage
TANKS, Welded Steel
TOWERS, Bubble
VESSELS, Pressure

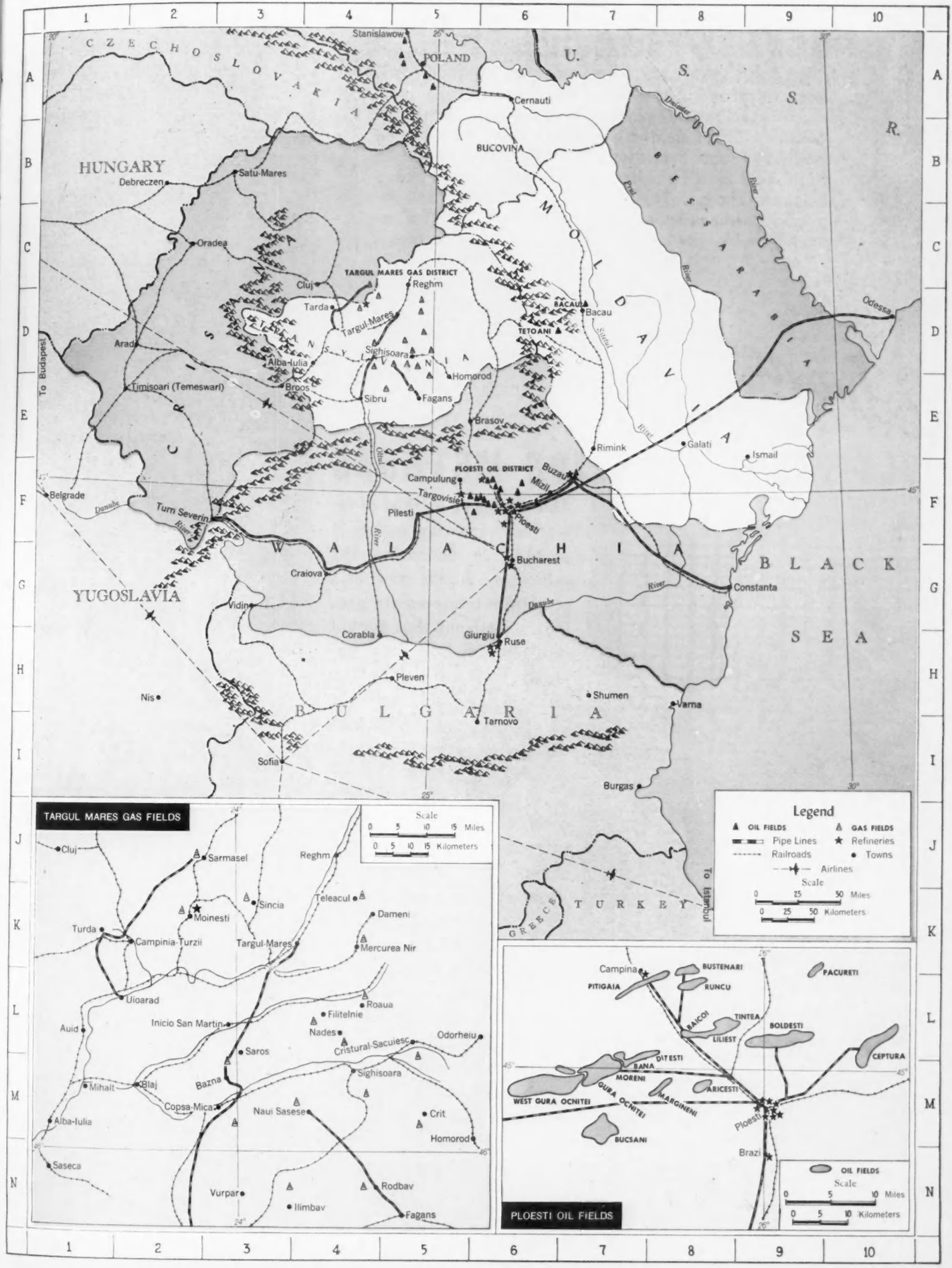
TULSA BOILER & MACHINERY CO.

TULSA 1, OKLAHOMA

EXPORT OFFICE: Room 1940, 30 Rockefeller Plaza New York 20, N. Y.

ROUMANIA

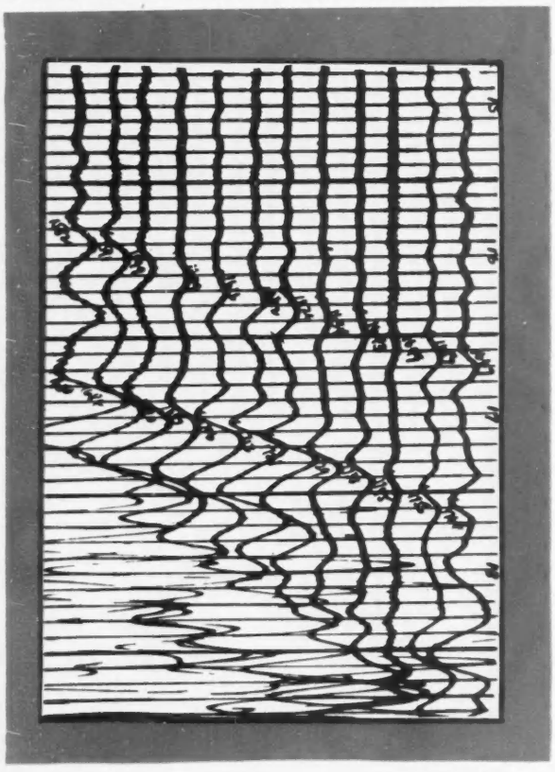
(International Boundaries as of 1938)



Advanced
REFLECTION METHODS

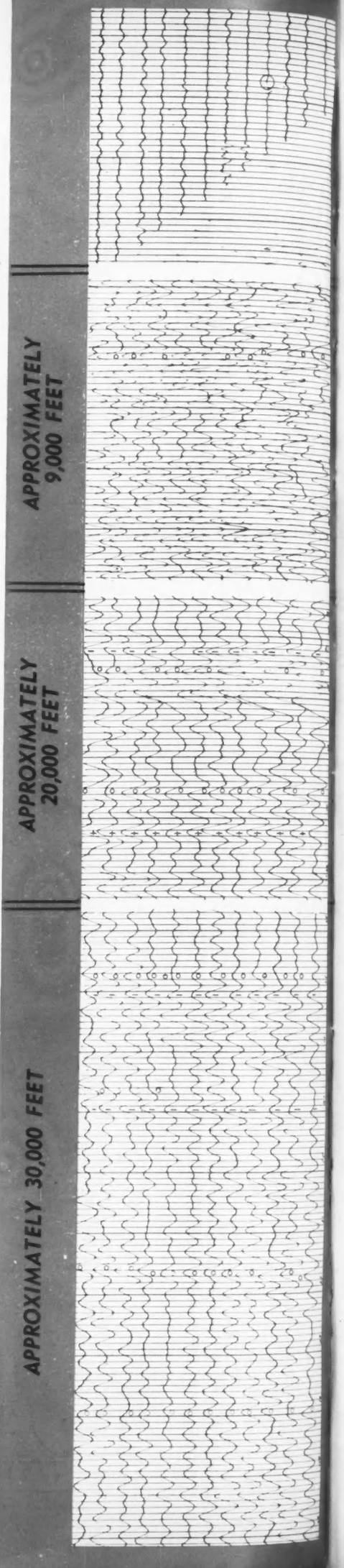
Using seismograph amplifiers with an automatic volume control that has a linear frequency response over a 30,000 to 1 taper, our crews have obtained consistent reflections from depths of 38,000 feet and more in their Gulf Coast operations. They were able to obtain these recordings by using the standard 5 to 10 pound dynamite charge. This advanced method of seismograph recordings opens unlimited opportunities for exploring the deeper horizons with dependable accuracy.

Advanced
MULTIPLE REFRACTION METHODS



The multiple refraction method is of particular value in areas where the reflection method is not easily applicable. This, in general is true of Southern Florida, Southern Mississippi, Texas Panhandle, Edwards Plateau, Southeast Colorado, and Western Oklahoma. Multiple refraction methods have a distinct advantage over reflection methods in areas covered by caliche or other broken material.

This advanced method of refraction recording makes it possible to determine the velocities, depths and dips of certain intermediate geological horizons that cannot be determined by the usual refraction or reflection methods. Several refracted events are recorded on one oscillogram with one charge of dynamite, and each wave is registered so that its independent character is readily discernible and the interpreter can identify each event as being a certain geological horizon. In Southern Florida, with these data, cross section profiles are constructed which give depths to two limestones having different velocities and another geological horizon with a very much higher velocity.



Leonard J. NEUMAN
GEOPHYSICAL COUNSELOR & CONTRACTOR
OFFICE 942 Mello Esperson Bldg. LABORATORY Pecan Road
HOUSTON TEXAS

ROUMANIA

EFFECT OF WAR

ROUMANIA refineries were badly damaged by Allied bombings but the wells and producing properties are in good shape, excepting for the dire need of modern equipment. Refining capacity has been restored to about 77 percent of prewar capacity.

Refining facilities were badly damaged by Allied bombings but the wells and producing properties are in good shape, excepting for the dire need of modern equipment. Refining capacity has been restored to about 77 percent of prewar capacity.

At the beginning of the war, in 1941, Roumania's annual output was 40,517,120 barrels, or about 110,000 barrels daily. After a small increase in 1942, the annual production dropped to 26,190,750 barrels in 1944, or about 71,750 barrels daily. However, the production increased sharply during 1945 to a total of 34,475,200 barrels, or about 94,450 barrels daily, still below the prewar level.

Reports say that bottom hole pressure, in flowing wells, has shown no greater decline than the ordinary orderly withdrawal of crude would indicate.

Roumania Monthly Completions and Production
(By Months)

Month	Wells Completed, 1944				Wells Completed, 1945				1945 Prod. (Barrels)	1945 Drilling (Feet)
	Oil	Gas	Abnd.	Total	Oil	Gas	Abnd.	Total		
January	13	2	..	15	5	1	1	7	2,801,110	11,316
February	11	..	2	13	2	..	..	2	2,555,920	17,220
March	12	..	..	12	6	1	..	7	2,882,840	39,360
April	16	..	5	21	4	1	1	6	2,934,850	49,200
May	11	1	2	14	8	1	..	9	3,024,010	68,224
June	2	..	..	2	8	2	2	12	2,912,560	56,744
July	7	1	..	8	9	..	..	9	2,994,290	68,880
August	6	2	..	8	9	..	..	9	2,994,290	58,712
September	2	1	..	3	2	1	..	3	2,882,840	48,216
October	9	..	1	10	8	1	2	11	2,934,850	45,920
November	4	..	1	5	5	1	2	8	2,823,400	31,488
December	5	1	2	8	7	1	..	8	2,867,980	29,520
Total	98	8	13	119	73	10	8	91	34,475,200	524,800

Roumania Drilling Activity in 1944 and 1945

MONTH	WELLS DRILLING AT END OF EACH MONTH							
	1944				1945			
	Exploratory	Field Drilling	Workover	Total	Exploratory	Field Drilling	Workover	Total
January	22	70	16	108	9	22	14	45
February	22	69	8	99	7	22	16	45
March	23	59	17	99	6	32	20	58
April	17	62	12	91	8	32	13	53
May	10	49	16	75	4	46	18	68
June	7	35	12	54	6	39	22	67
July	5	39	13	57	8	48	20	76
August	9	35	13	57	7	25	7	39
September	8	26	13	47	7	18	8	33
October	10	36	14	60	7	26	14	47
November	8	27	17	52	7	40	23	70
December	7	23	15	45	9	33	29	71

Note: Exploratory wells include extension and deep test wells in fields.

Roumania Annual Production, Refining, and Drilling

YEAR	Gross Production (Barrels)	Amount Refined Inside Country (Barrels)	Drilling (Feet)
1938	49,112,300	46,196,025	944,640
1939	46,363,200	43,372,625	839,680
1940	43,168,300	40,656,960	770,800
1941	40,517,120	39,163,530	829,650
1942	42,093,603	39,081,800	1,127,628
1943	39,181,600	36,518,450	1,119,982
1944	26,190,750	22,884,400	482,160
1945	34,475,200	35,389,090	524,800

Salient Data on Refineries of Roumania

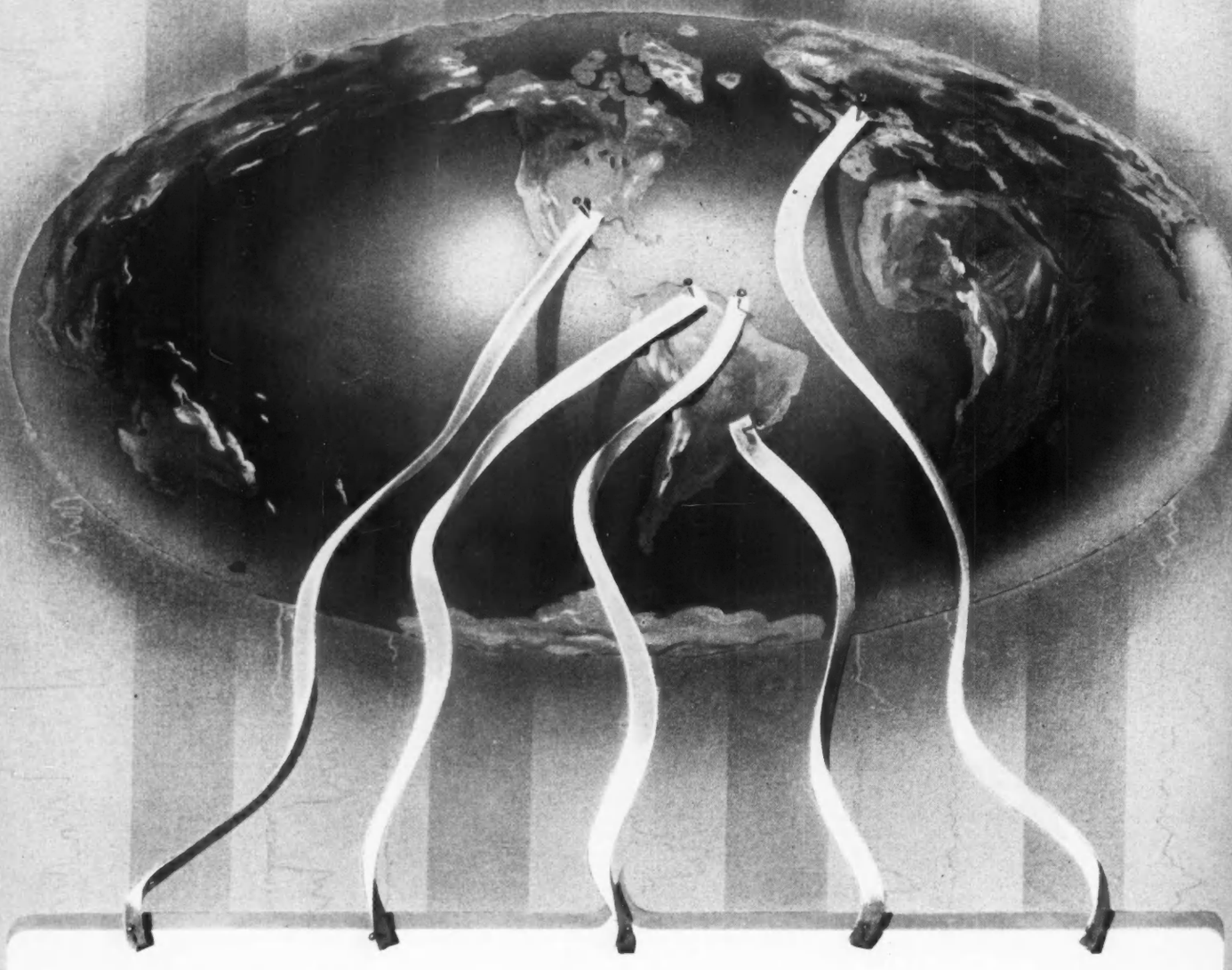
COMPANY	Location of Plant	Crude Charging Capacity (Barrels) Daily)	Cracking Capacity (Barrels) Daily)	Type of Refinery
Astra Romana S.A. (Shell) No. 32 Boulevard Regele Carol I, Bucarest	Ploesti-Sud	43,000	13,000	Complete
Colombia Societe Franco-Romaine de Petrol, 10 rue Romana, Bucarest	Ploesti-Sud	10,000	5,000	Skim-Crk
Concordia Societe Anonyme Romaine pour l'Industrie du Petrole, Strada Matei Millp, No. 15, Bucarest	Ploesti-Nord	29,000	4,200	S-S
Creditul Miniere S. A. Rumaine pour le Developpement de L'Industrie Miniere, Boulevard Bratianu 16, Bucarest	Brazi-Prahove	11,000	3,500	Complete
	Doicesti	1,750	None	Skimming
Dacia Romano Pet. Synd. Ltd., 83 Cannon St., E. C. 2, London; Cantacuzino 33, Bucarest	Ploesti-Nord	5,000	None	Skim
Neo Petrole (Fratia)	Ploesti-Sud	3,000	None	Skim
I. Grigorescue S. A., Str. Poetul Alexandrescu No. 30, Targoviste	Targoviste	1,500	None	Skim
Noris	Ploesti-Sud	1,200	None	Skim
"Petrol Block" Societe Anonima Romana, Strada Nicolae Golescu No. 7, Bucarest	Plopeni-Prahova	1,000	None	Skim
	Ploesti	8,500	4,000	Skim-Crk
Petrol Latina S.A. Romana, Strada Benito Mussolini 53, Bucarest	Bucarest	1,100	None	Skim
"Petrolmina" Societate, Romana de Mine si Petrol, Strada Gogu C. Cantacuzino 33, Bucarest	Ploesti	3,000	None	Skim
"Photogen" Rafineria de Petrol S. A. (Socony Vacuum) Str. Juli Maniu 104-108, Brasov	Brasov	750	None	Lube-Wax-Asphalt
"Redeventza" S. A. Pentru Exploatarea si Comertul Produselor Subsolului, Rue Georges Clemenceau No. 2, Bucarest	Ploesti-Nord	3,500	None	Skim
Romano-Americana S. A. (Standard of N.J.) 126 Calea Victoriei, Bucarest	Teleajen	20,000	8,000	Complete
Romano-Belgiana Depetrol S. A. Str. Biserica Amzel No. 28, Bucarest	Ramnicul-Sarat	1,000	None	Skim
Spies Pet. Co. Ltd., 17 Waterloo Place S.W. 1, London	Ploesti	5,000	None	Skim
Steaua Romana S.A. pour l'Industrie du Petrole, Boulevard Carol 17, Bucarest	Campina	31,000	6,300	Complete
	Moinesti	2,000	None	Skim
	Bucarest	1,000	None	Skim
Rafinarie de Petrol Titan S. A. R., Boulevard Carol No. 30, Bucarest "Unirea" Societate Anonima Romanada Petrole (Phoenix Oil & Transport Co. Ltd.,) Str. Gen. Berthelot No. 90, Bucarest	Ploesti (2 Plants)	23,000	3,500	Complete

Engineering and Geological Data on Principal Roumania Oil Fields

FIELD, PROVINCE	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION						
			Name	Kind	Age	Depths of Wells (Feet)		Average Thickness of Pay (Feet)	Type Structure
						Minimum Top Pay	Maximum Total Depth		
Aricesti, **Prahova**	1000	35	Meotic	Sand	Pliocene	5500	7400	30	Anticline syncline
Baicoi, Liliestl, Tintea, **Prahova**	850	39	Dacic, Meotic	Sand	Pliocene	600	8800	200	Anticline syncline
Boldesti, **Prahova**	5000	37	Meotic	Sand	Pliocene	6900	7900	90	Anticline faulting
Bucsani, **Dambovita**	3900	38	Meotic	Sand	Pliocene	6500	7300	30	Anticline faulting
Bustenari, Runcu, **Prahova**	5250	42	Meotic-Oligocene	Sand	Pliocene, Oligocene	100	2500	160	Monocline fault
Pitigaia, **Prahova**	580	41	Meotic	Sand	Pliocene	700	1200	140	Monocline fault
Ceptura, **Prahova**	2100	34	Meotic	Sand	Pliocene	2400	4100	110	Anticline
Moinesti, Lucacesti, **Bacau**	275	43	Meotic, Oligocene	Sand	Pliocene, Oligocene, Eocene	200	1000	40	Anticline
Moreni, **Dambovita and Prahova**	3700	33	Dacic, Meotic	Sand	Pliocene	1400	5600	300	Syncline Anticline
Pacureti, **Prahova**	150	52	Dacic, Meotic	Sand	Pliocene	2000	4000	180	Anticline faulting
Gura Ocnite, **Dambovita**	1300	33	Dacic, Meotic	Sand	Pliocene	1300	4000	150	Syncline Anticline
Moreni North, **Dambovita-Prahova**	1100	33	Dacic, Meotic	Sand	Pliocene	1000	4000	90	Syncline Anticline
Ditesti, **Prahova**	540	33	Meotic	Sand	Pliocene	6900	7300	50	Syncline Anticline
Margineni, **Prahova**	450	39	Meotic	Sand	Pliocene	6100	7500	20	Anticline faulting

Wherever men drill for oil there's

SCHLUMBERGER



Schlumberger Well Surveying Corp.

Houston, Texas

Serving the United States

"Schlumberger" Surenco S.A.

Caracas, Venezuela

Serving: Mexico, Venezuela, Colombia, Brazil, Ecuador, Peru, Trinidad, Cuba, Haiti and Santo Domingo

Schlumberger Overseas

San Fernando, Trinidad

Serving: Egypt, Netherlands East Indies, Borneo, Burma and India

Compania de Investigaciones Geofisicas Schlumberger

Buenos Aires, Argentina

Serving: Argentina and Chile

Societe de Prospection Electrique

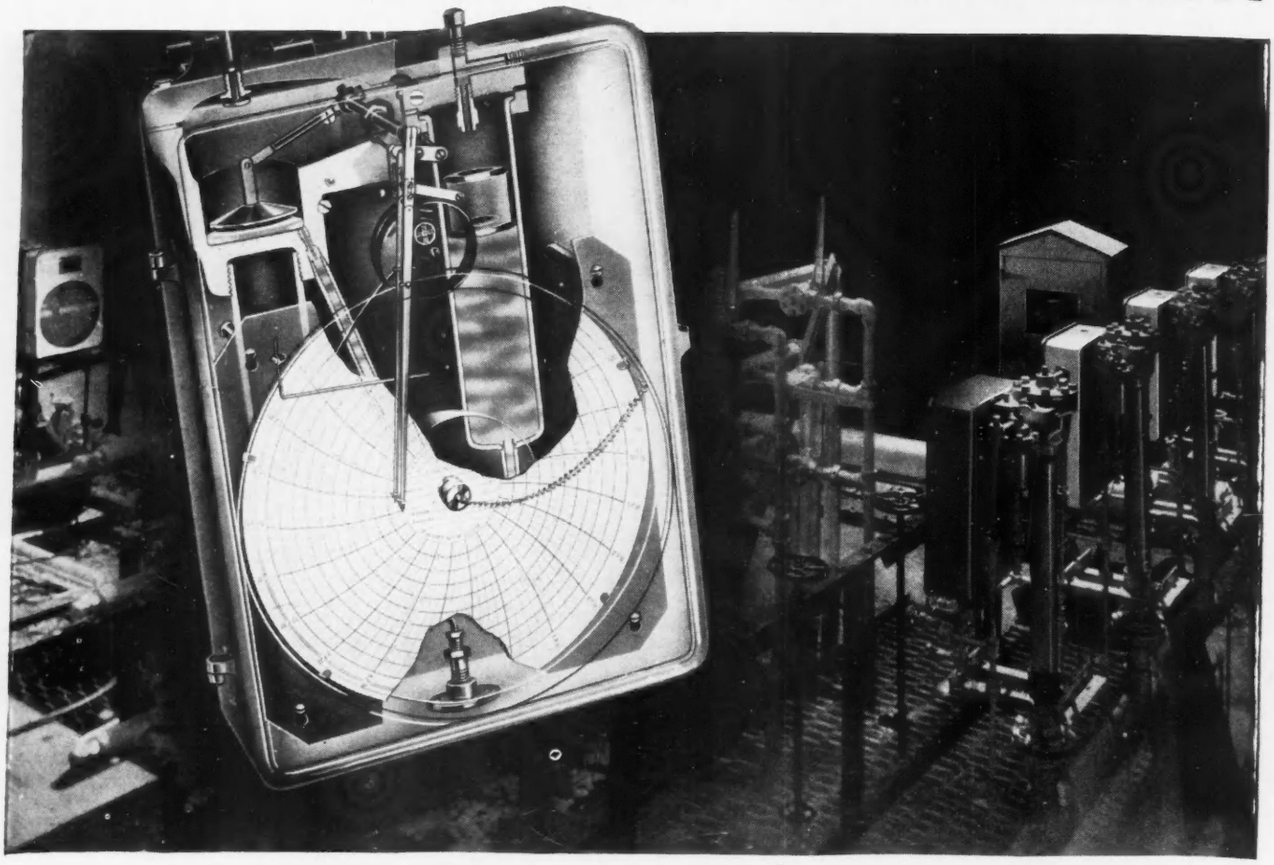
Paris, France

Serving: England, Europe and French Colonies

U. S. S. R.—European Area

(International Boundaries as of 1938)

Every part ACCESSIBLE FOR EASY ADJUSTMENT



. . . . out in the field!

IT TAKES a practical instrument to earn the reputation for low-cost accuracy which Westcott-AMERICAN orifice meters enjoy throughout the world.

▪ That simplicity of design and experienced engineering primarily are responsible, is obvious to any engineer familiar with flowmeter operation.

▪ But Wescott-AMERICAN orifice meters and flowmeters go still further in giving you a practical instrument: All parts are made for easy adjustment with ordinary tools. A minor feature of the Westcott-AMERICAN, to be sure . . . but an important detail in reducing the cost of accuracy out in the field.

▪ New technical literature, giving complete data, will be mailed on request. Also information on the Round Case Indicating Flowmeters, Liquid Level and Flow Controllers.

D-345

AMERICAN METER COMPANY

INCORPORATED ESTABLISHED 1836

Albany • Baltimore • Birmingham • Boston
Chicago • Dallas • Erie • Houston
Kansas City • Los Angeles • New York
Philadelphia • Pittsburgh • San Franciso • Tulsa

U.S.S.R. (RUSSIA)

GENERAL STATUS

EVEN though actual official basic statistical data on U. S. S. R. oil developments during the war years are lacking, statements by Soviet oil leaders and press reports give an impressive picture of progress. Unfortunately, these statements have failed to make public any actual detailed data. They have talked about sharply increased producing rates, new important oil and gas field discoveries in many areas, and expanded refining and pipe line facilities.

The best available data put Soviet crude oil production at approximately 300,000,000 barrels for the year 1945, or 821,000 barrels daily. This represents a sharp increase above the 216,866,000 barrels (595,000 per day) credited to the nation in 1939, or at the beginning of the war. Apparently, Soviet production increased steadily, particularly during 1943, 1944 and 1945, especially in the oil fields of the Ural-Volga area and also in Central Asia.

Russia's new industrial five-year plan, announced recently, calls for further increase of its crude oil production. One objective is an annual output of 60 million tons (approximately 450 million barrels, or in excess of 1,200,000 barrels daily) by 1951. This would be twice the U. S. S. R. output at the beginning of the war. In order to achieve this goal, increased prospecting and drilling is planned, it being announced that drilling operations in 1946 should be twice that of 1944.

All U. S. S. R. oil field operations are under government management, being managed by trusts or syndicates set up for the different producing areas. Russia's oil industry antedates that of the United States, but it was not until after 1924 that a serious attempt was made to modernize operations. Up until that time a considerable part of the country's production came from hand-dug shallow wells.

URAL-VOLGA AND KAMA RIVER AREAS

The greatest concentration of effort to develop additional oil producing capacity during the war was in the Ural-Volga and Kama river areas, probably because of the 1942 German military drive into the Caucasian region. Important developments were reported in both areas, and production increased sharply.

The Ural-Volga area, sometimes referred to as the "Second Baku" region, lies in central western European Russia and extends from the Volga River on the west to the slopes of the Ural Mountains on the east. The area consists of three main producing regions: the fields around Ishimbaevo; the Tuimaza field, and the Volga River Bend fields between Buguruslan and Syran. Output of the Ural-Volga area did not exceed 45,000 barrels daily at the beginning of the war, but by the beginning of 1945 was reported to be exceeding 225,000 barrels per day. The area received its first production in 1932, with completion of the discovery well at Ishimbaevo. In 1937 oil was discovered at Tuimaza, some distance north, and also at Buguruslan to the west.

The Kama River district is centered around the town of Molotov (Perm), 200 miles north of the Ural-Volga fields. This district is sometimes included in the Ural-Volga area, since it also lies between the Volga River and Ural Mountains, but in this report it is considered a separate area because of its distance from the so-called Ural-Volga fields. The first production in the Kama River region occurred at Chusovskiye Gorodki in 1929, but the area did not receive its first real impetus until 1935 when a well being drilled for water at Krasnakamsk found large quantities of oil.

An important wartime development was the finding of the first Devonian production in Russia. This occurred in both the Ural-Volga area and the Kama River area. In

Engineering and Geological Data on U. S. S. R. European Fields

AREA AND FIELD	Location On Map	Year of Discovery	Gravity of Oil (API)	PRODUCING FORMATION		
				Age	Depth (Ft.)	Type Structure
Baku (Azerbaijan) Area:	Page 219					
Artem (Holy Island)	F-8	1902	19–23	Middle and Lower Miocene	3590–9000	Anticline
Baladzhary	F-5	1923	....	Lower Miocene	4729	....
Balakhany	F-6	1873	19–33	Upper to Lower Miocene	3800–5184	Anticline
Bibi-Eibat	G-5	1892	24–37	Lower Pliocene	3500–5000	Anticline
Binagadi	F-6	1903	21–35	Lower Pliocene	1500–3116	Anticline
Durov Dag	M-2	....	....	Middle Pliocene	.....	Anticlinal fold
Duz Dag	N-2	....	....	Middle Pliocene	.....	Anticlinal fold
Falmay	F-6	....	....	Upper Pliocene	.....	Anticline
Gamma	K-3	....	....	Middle Pliocene	.....	Anticlinal fold
Kala	F-7	1932	29–40	Upper to Lower Pliocene	2800–4200	Dome on fold
Kara-Chklur	G-6	1929	37	Middle to Lower Pliocene	3440–9000	Anticline
Kara Dag	H-4	....	....	Middle Pliocene	5340	Anticlinal fold
Kyzyl-Tepes	G-4	1936	21–31	Middle Pliocene	.....	Anticline
Lok-Batan	G-5	1932	21–27	Middle Pliocene	.....	Anticlinal fold
Mahomedly	F-6	....	....	Upper Pliocene	.....	Anticline
Nephte Chala	N-3	1931	....	Upper and Middle Pliocene	.....	Anticlinal fold
Peschanny	G-6	....	....	Middle to Lower Pliocene	.....	Anticline
Pirsagat	J-3	1936	....	Middle Pliocene	4120	Anticlinal fold
Puta	G-5	1926	23–24	Middle Pliocene	.....	Anticlinal fold
Saryncha-Guilbakht	G-4	....	....	Middle Pliocene	.....	Anticline
Shongar	G-4	1936	....	Middle Pliocene	.....	Anticline
Shuraabad	D-4	....	36	Oligocene	Shallow	Overthust fault
Shubany	G-5	1910	21–23	Lower Pliocene	.....	Anticlinal fold
Sion Shor	F-5	....	23–29	Lower Pliocene	5180	Anticlinal fold
Siazan	C-2	1940	36	Cretaceous and Oligocene	Shallow	Oberthrust fault
Surakhany	G-6	1910	41–43	Upper to Lower Pliocene	3800–5200	Anticline
Sulu-Tepe	F-5	1933	23–29	Lower Pliocene	5200	Anticline
Touragai	I-3	....	....	Middle Pliocene	.....	Anticlinal fold
Zykh	G-6	1935	37	Middle to Lower Pliocene	.....	Anticlinal & Domal
Crimea Area:	Page 227					
Arma Eli	B-2	....	....	Middle Miocene	.....	Anticlinal fold
Changelek	C-5	....	23–35	Middle Miocene	.....	Anticlinal fold
Kop Kochegen	C-4	....	....	....	.....	Anticline
Kerleut	C-2	....	....	Middle Miocene	.....	Anticlinal fold
Maly Babchik	A-4, 5	....	....	Middle Miocene	.....	Anticlinal fold
Mayak	B-5	....	....	Middle Miocene	.....	Anticlinal fold
Tarkhan	A-5	....	....	Middle Miocene	.....	Anticlinal fold
Daghestan Area:	Page 221					
Achi Su	C-3	1936	30–36	Lower Miocene	985–2295	Anticline
Berekei	E-5	1901	31–33	From contact between Oligocene and Eocene	.....	Dome
Dag Ogni	F-6	1924	Gas	Oligocene	1000	....
Duzlak	E & F-6	....	Gas	....	.....	Dome
Izber Bash	C-4	1936	38	Middle and Lower Miocene	3025–3470	Domal Anticline
Kava Kent	D & E-5	1936	22–34	Middle Miocene	655–1640	Anticline

Table continued on page 225

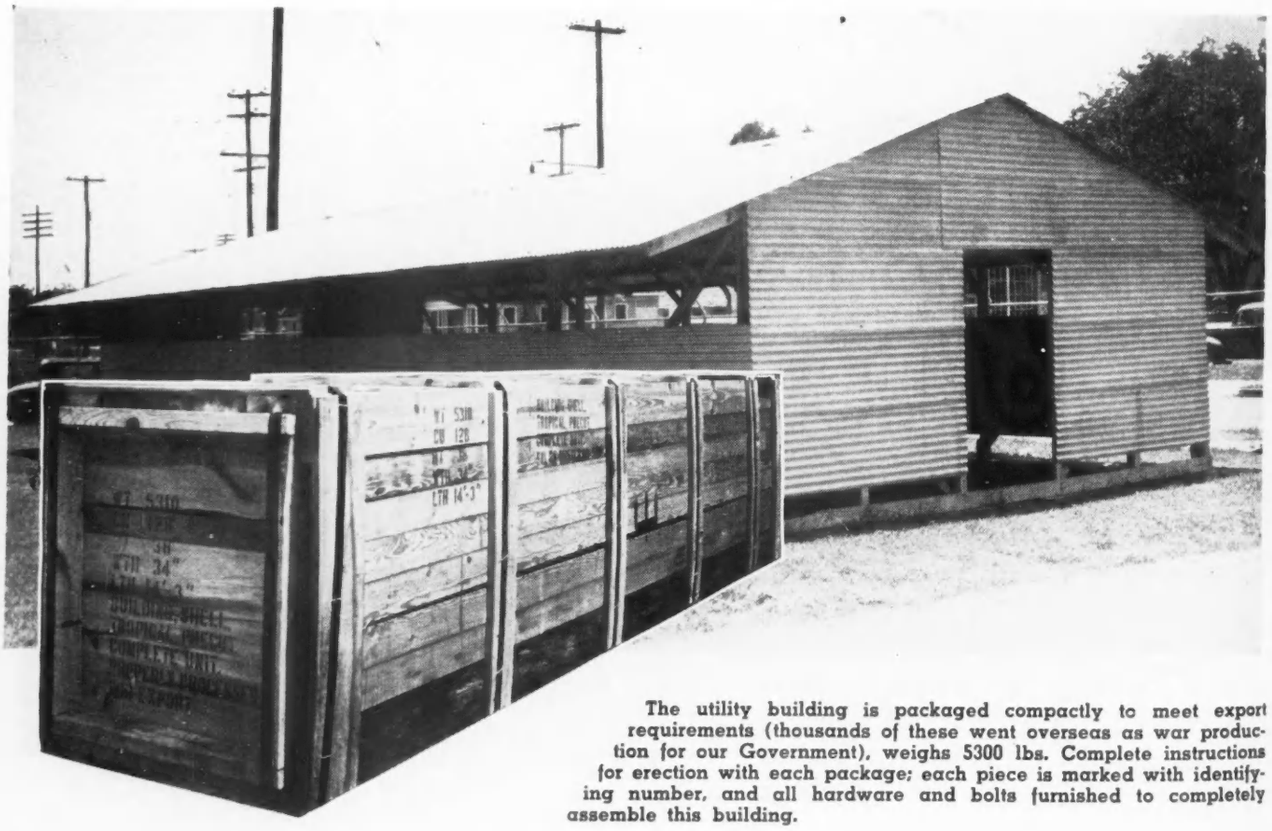
Prefabricated HOUSING FOR THE OIL INDUSTRY

The scene above shows a few of the units recently prefabricated in our plant and erected by a major oil company in the middle of a Texas oil field. Prefabricating houses for the oil industry is not a new project for us. In fact, in many of the oil fields of the United States and Latin America, you find not only individual homes for workers, but bunkhouses, mess halls, garages, offices, and warehouses, all prefabricated in our plant.

For the present, we are prefabricating only individual houses, due to the critical materials situation. Another popular product of our production line has been the prefabricated utility building, for any use requiring a 20 x 50-foot building made of galvanized iron. These will be produced as material becomes available.

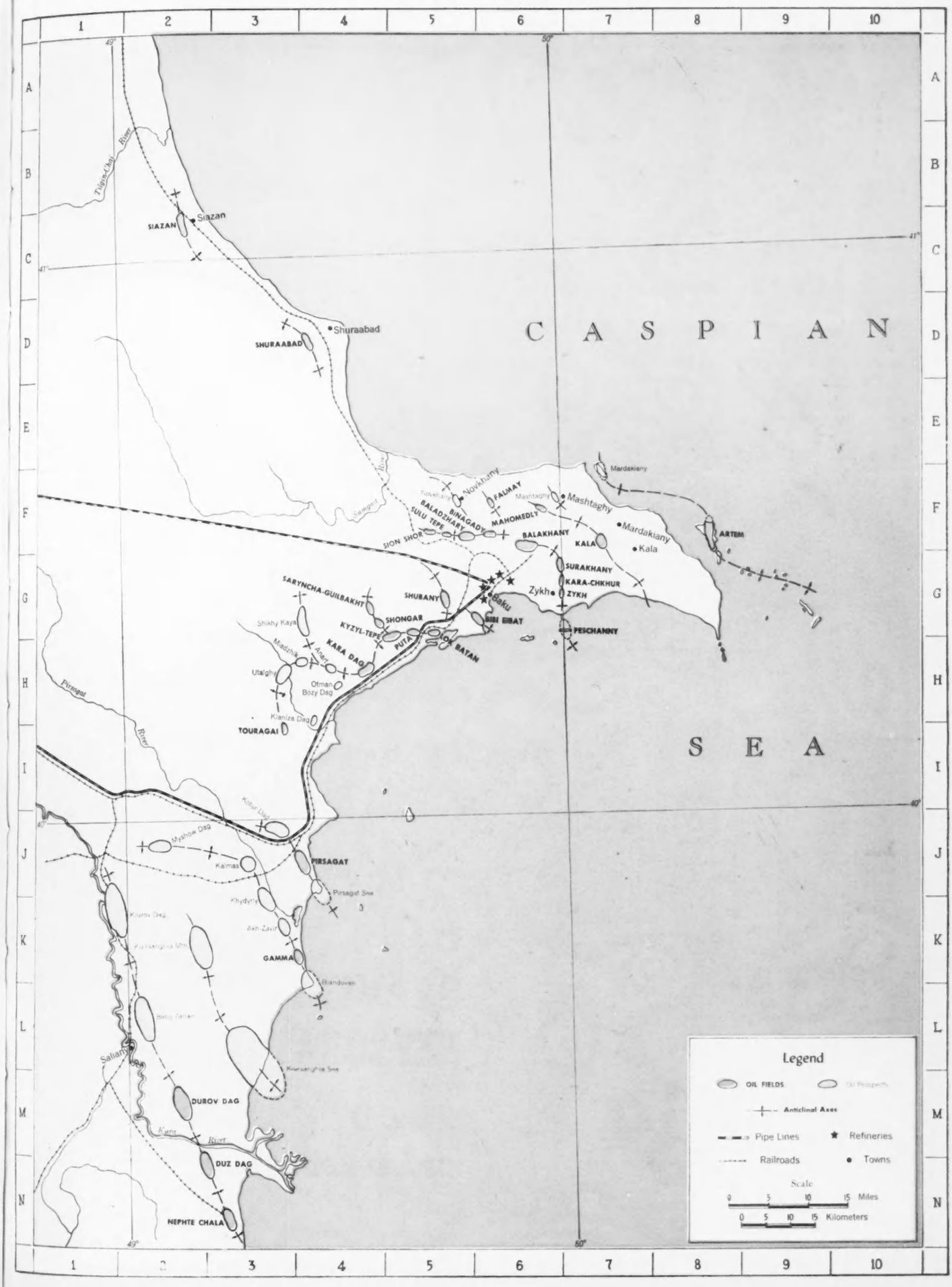
HOUSTON READY-CUT HOUSE COMPANY

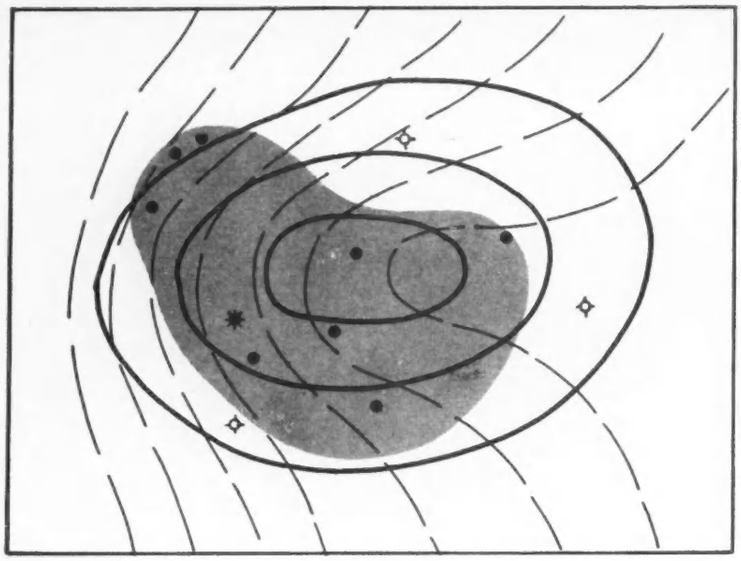
3601 POLK AVENUE Prefabricators since 1917 **HOUSTON, TEXAS**



The utility building is packaged compactly to meet export requirements (thousands of these went overseas as war production for our Government), weighs 5300 lbs. Complete instructions for erection with each package; each piece is marked with identifying number, and all hardware and bolts furnished to completely assemble this building.

U. S. S. R.—Baku (Azerbaijan) Area





...Getting the gravity picture...

For more than twenty years we have been making and interpreting gravity surveys in most of the petroleum provinces of the world . . . localizing structural areas. That experience is available to you, and is your assurance of accurate surveys, soundly interpreted.

GRAVITY METER EXPLORATION CO.

geophysicists

ESPERSON BLDG. • HOUSTON, TEXAS

W. G. SAVILLE *A. C. PAGAN* *J. P. SCHUMACHER*

U. S. S. R.—Continued

August, 1944, a deep test in the heretofore shallow Tuimaza field, west of Ufa, found oil at 9600 feet in the Devonian. Since then Devonian production also has been opened near the Yablanovo field. Apparently Devonian production will be found over a wide area west of the Ural Mountains, for it was proved productive in 1945 in the Severokamsk field in the Kama River area.

CAUCASUS REGION

Despite the advancement of the Ural-Volga and Kama River areas, the principal Soviet oil producing areas are still in the 272,000 square mile Caucasus region, between the Caspian and Black Seas. In this region are the important producing areas of Azerbaijan (Baku) and Grozny, each of which are made up of a large number of individual producing fields. In addition, the area includes the lesser important areas of Daghestan, Kuban-Maikop and Georgian.

Baku, located mainly on the Apsherson Peninsula but also extending south along the western shores of the Caspian Sea to include what is sometimes called the Kura fields, is the oldest and by far the most important group of Russian fields. It is one of the most productive spots in the world, being exceeded in cumulative recovery only by the famous East Texas field of the United States. The discovery of new fields and deeper producing formations maintain Baku production around 150,000,000 barrels annually, although the region has been producing since about 1880. Latest developments in the region include the adoption of marine drilling, with the result several fields are being developed offshore. More than 8000 wells have been drilled in the Baku area. Twenty-nine fields are productive in the area. Production is principally from the Pliocene, which is 6000 feet thick.

The Grozny area, west and north of Baku, is another important producing area. Production is found in a series of folds paralleling the mountain range. Its anticlinal structures are complexly faulted. Production comes from the Miocene and Oligocene, principally the former. Production of Grozny, which comes from 11 fields, has been declining in recent years.

The Kuban-Maikop area, which lies to the west of Grozny inland from the east shore of the Black Sea, is another important Caucasus producer. Both the Miocene and Oligocene are productive.

To the north of Baku along the western shores of the Caspian Sea is the narrow Daghestan producing area. Another oil producing area in the Caucasus is the Georgian, but it is of minor importance as yet although prospects are considered good.

OTHER EUROPEAN REGIONS

All the areas discussed so far have been located in European Russia, which also has the Emba Basin, the Crimea, the Ukraine and the Pechora producing areas. Most important of these is the Emba area, which lies on the north end of the Caspian Sea between the Ural and Emba rivers. This huge basin is noted for its salt domes and salt anticlines. The Crimea, Ukraine and Pechora areas are relatively unimportant in the current setup and have not been intensively prospected. The latter is far to the north near the Arctic Circle. Press reports heralded discovery of oil at Ivanova, north of Moscow, which is far removed from any other oil production. The widespread location of producing areas in European Russia would indicate that practically all the area west of the Ural Mountains has excellent oil possibilities.

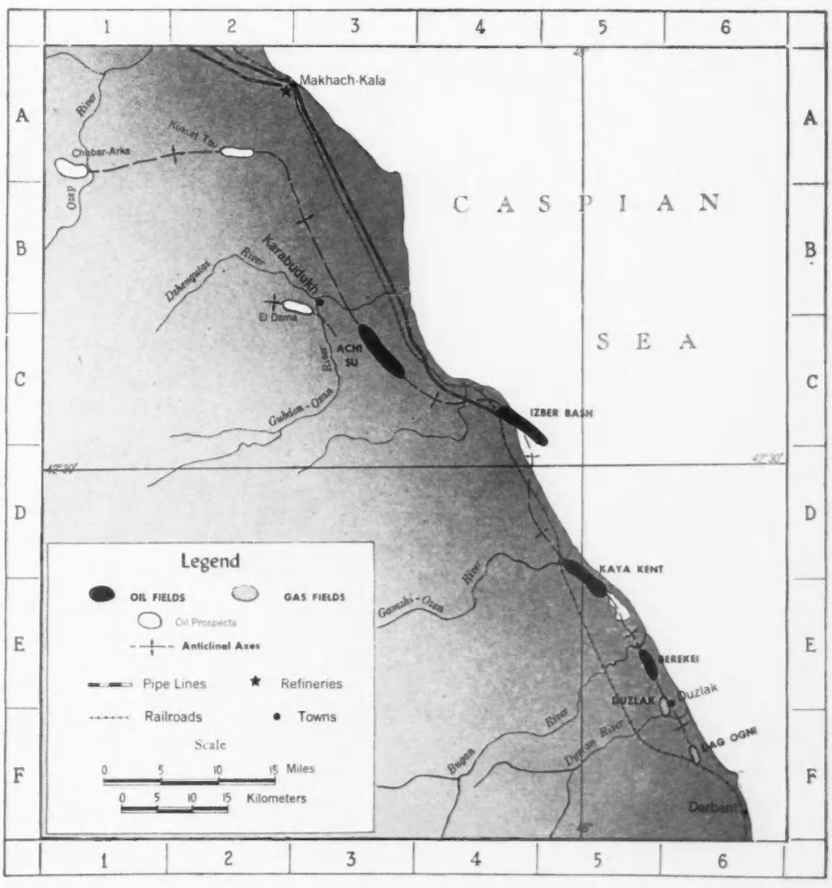
ASIATIC FIELDS

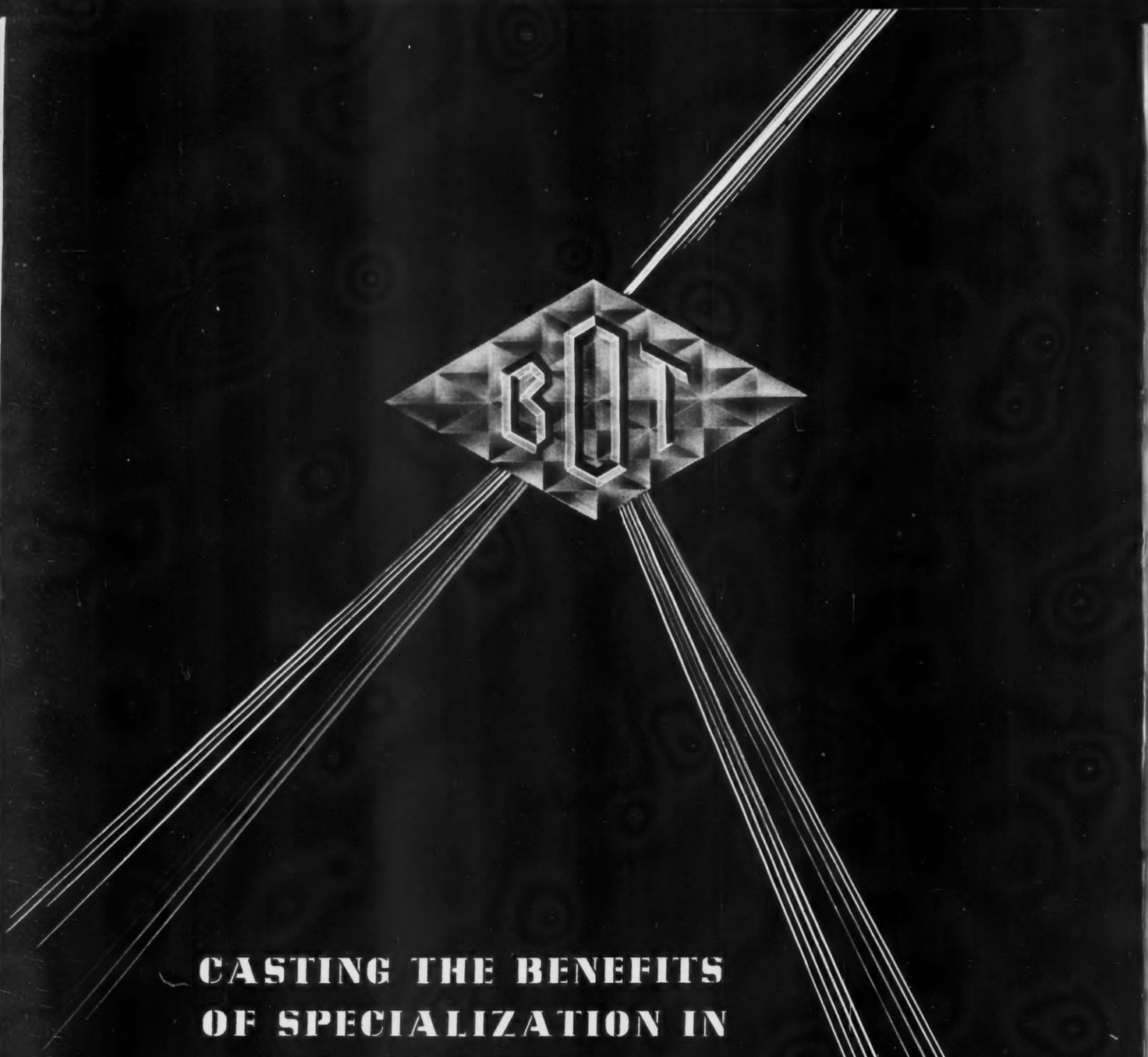
In addition to its European fields and prospects for much additional oil discovery in Europe, the U.S.S.R. has developed production on the west side of Asia, in Central Asia, and in extreme eastern Asia.

On the western shore of the Caspian Sea, opposite the Baku fields, lies the Turkmen fields. Farther inland, in south Central Asia, is the Uzbek-Tadzik-Kirgiz (Fergana) producing area, while on the Pacific Ocean side of Asia, there is the Sakhalin Island production.

Several important discoveries were made in the Fergana area during the war, and this region is thought to have big potentialities. About 25 fields are now productive at Fergana. The oil belt at Sakhalin is 25 miles wide and 250 miles long

DAGHESTAN AREA OF RUSSIA





CASTING THE BENEFITS OF SPECIALIZATION IN YOUR DIRECTION

The history of Brown Oil Tools, Inc. is one of concentrating on the development of equipment and services to increase the efficiency of drilling and producing operations. Engineers, superintendents, drillers and others concerned with the same improvements have channeled their difficult and unusual problems into our organization for study, analysis, and usually a solution.

The highly efficient, specialized Brown Oil Tools equipment and services available to you today are the direct result of this program which has been in operation for many years. Some major achievements of this program are the Brown L-12 deep well control head packer with practically 100% slip contact with the casing; The Drilling Jar-Safety-Joint which minimizes sticking drill collars and bits; and the Casing Patch Tool, which requires but one trip in the hole to make a secure, leak-proof casing patch.

Call on Brown when confronted with the unusual or difficult in drilling and producing operations.

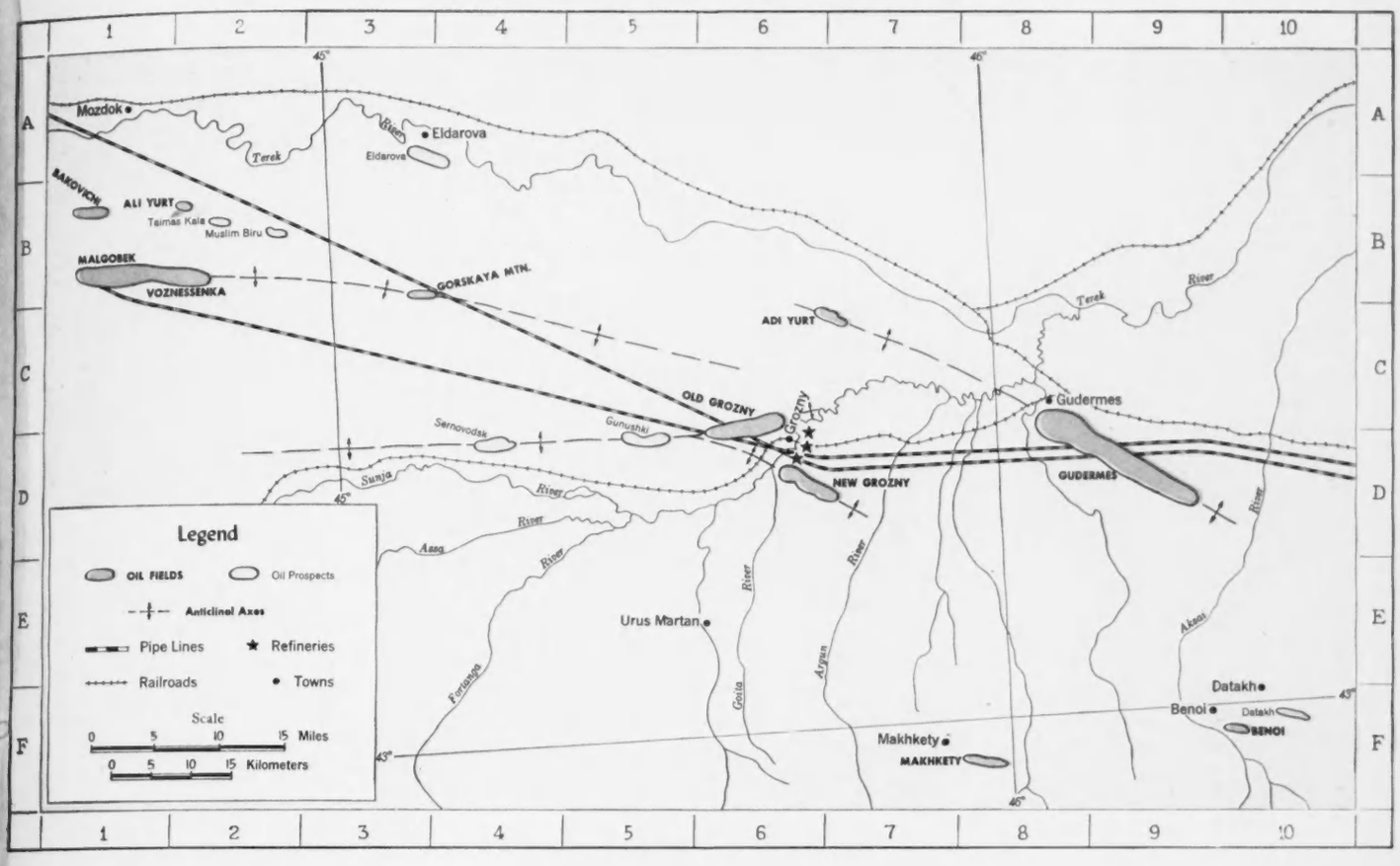
BROWN OIL TOOLS, INC.

HOUSTON, TEXAS

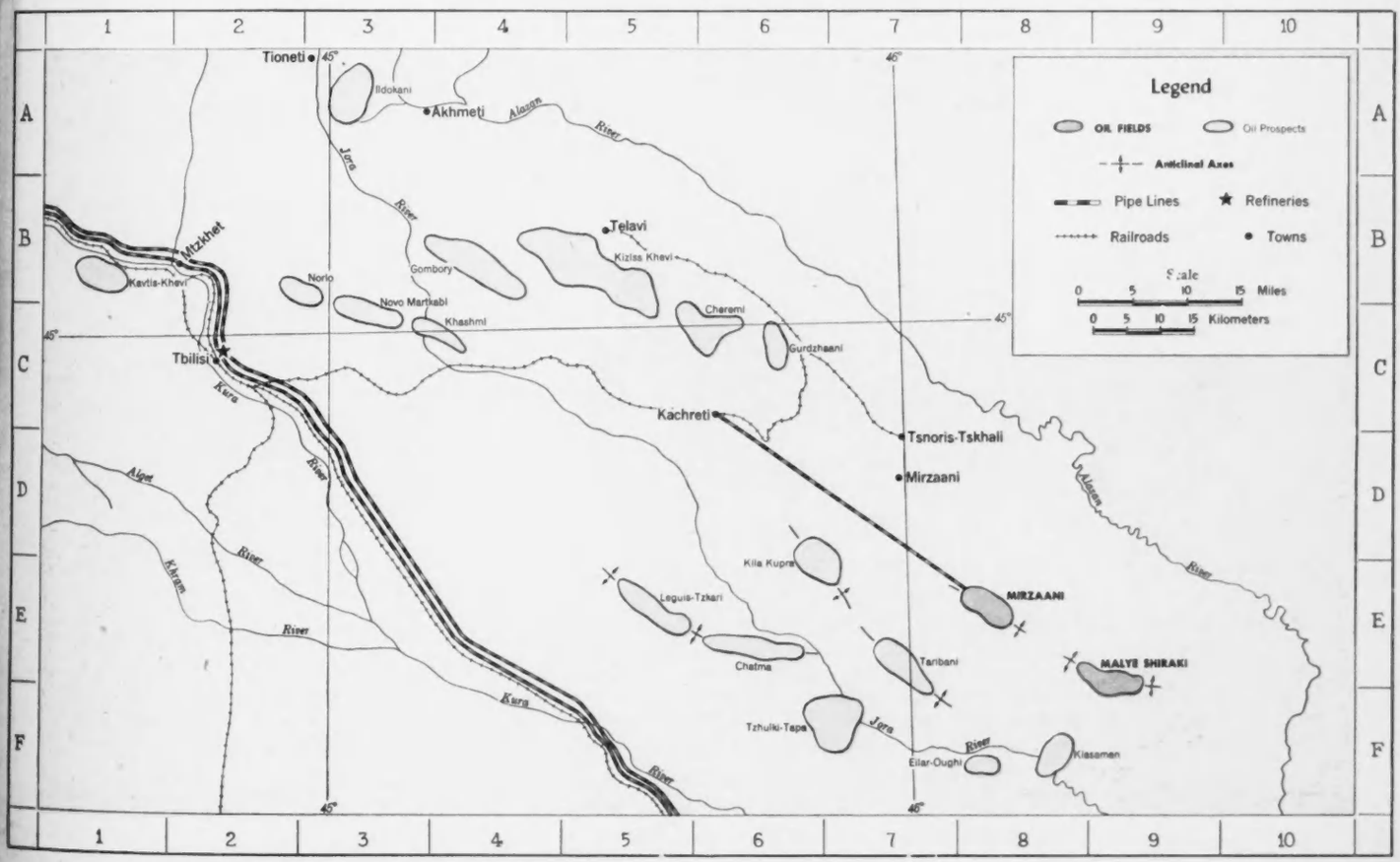
Export Sales: ACME WELL SUPPLY CO. — 19 Rector St., New York 6, N. Y.

VOULGARIS

U. S. S. R.—Grozny Area



South Georgian Area



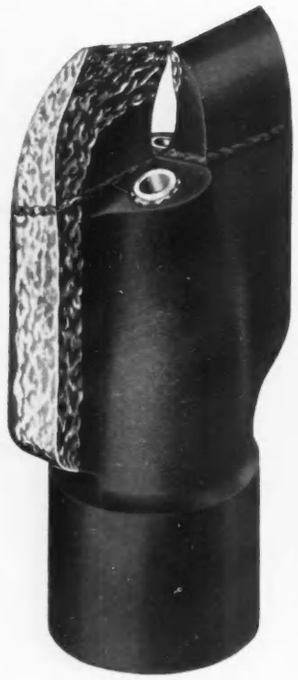
GREEN HEAD BIT & SUPPLY CO.

TELEPHONE 2-5225
POST OFFICE BOX 4327

901 Southeast 29th Street
OKLAHOMA CITY, OKLAHOMA

STORES
OKLAHOMA CITY • HOUSTON, TEXAS
ODESSA, TEXAS • GOODWELL, OKLA.

EXPORT OFFICE: GUY E. DANIELS, 30 ROCKEFELLER PLAZA, NEW YORK CITY



GREEN HEAD REPLACEABLE BLADE TYPE

(2-3 and 4 WAY)

Economy is the keynote of Green Head Replaceable Blade Type Bits.

Worn blades are removed and new ones replaced "easily and quickly."

Foreign operators have found this feature especially helpful. The Blades are of Molybdenum steel, inserted, hard surfaced and heat treated under close technical control—with hard water courses.

Under the most rigid test they have proved to be fast, durable and, above all, economical.

IF IT'S GREEN HEAD—"IT'S RIGHT"

Down through the years, Green Head Bits have proved this statement. Both domestic and foreign operators say Green Head drag type bits help them to make a straighter hole in faster time and for less money.

Used the World over—where time means money and time saving means profit.

Green head products are designed right, the materials are right and the workmanship is right.

IF IT'S GREEN HEAD

"IT'S RIGHT"

Green Head—2-3-4-6-Way
(REGULAR TYPE)
This bit is an old reliable. It is especially designed for use in hard formations, with plenty of reaming surfaces so as to help keep full gauge hole.

Green Head Pilot—6-Way
(REGULAR TYPE)
Bit is streamlined for speed and rugged enough to hold its own against any other leading bit made when it comes to wearing qualities.

Green Head—Fish Tail
(REGULAR TYPE)
This Bit is designed primarily for fast drilling in soft formations, with wide reamer surface for making full gauge hole.

U. S. S. R.—Continued

along the west coast. Production of the six fields is said to approximate 5 million barrels annually.

Prospecting efforts indicate Asiatic Russia has important oil possibilities throughout a large part of its immense territory, numerous prospects having been mapped by geologists and geophysicists.

OTHER OIL SOURCES

In addition to its own important petroleum production, the Russians control the Estonian shale industry, largest in the world. Plans are to enlarge these operations, and to develop methane gas works near Tallin, Estonia, for the purpose of supplying Leningrad 160 miles away.

Still another source of production for Russia is Roumanian oil. Following U. S. S. R. occupation of Roumania, Russia commenced construction of a 250-mile 10-inch pipe line that will bring Ploesti crude oil to the Black Sea port of Odessa.

The U. S. S. R. oil producing territory is to be further expanded if the Curzon line becomes the boundary between Poland and Russia. This would give Russia approximately half of the southern Poland oil fields.

NATURAL GAS DEVELOPMENTS

A great deal of attention has been devoted during the war to the development of gas production, and efforts have met with success. The most important source of gas developed has been that of the Saratov-Yelshanka area, which lies immediately south of the Volga River Bend group of fields in the Ural-Volga area. A sufficient supply has been proved in this area to warrant the construction of a 500-mile 10 and 12-inch pipe line to Moscow.

Important gas production also has been developed in the Volga River Bend fields, principally in the Buguruslan field. The town of Kuibyshev is supplied with gas through a 125-mile line from the Bugurslan field, and a second carrier from

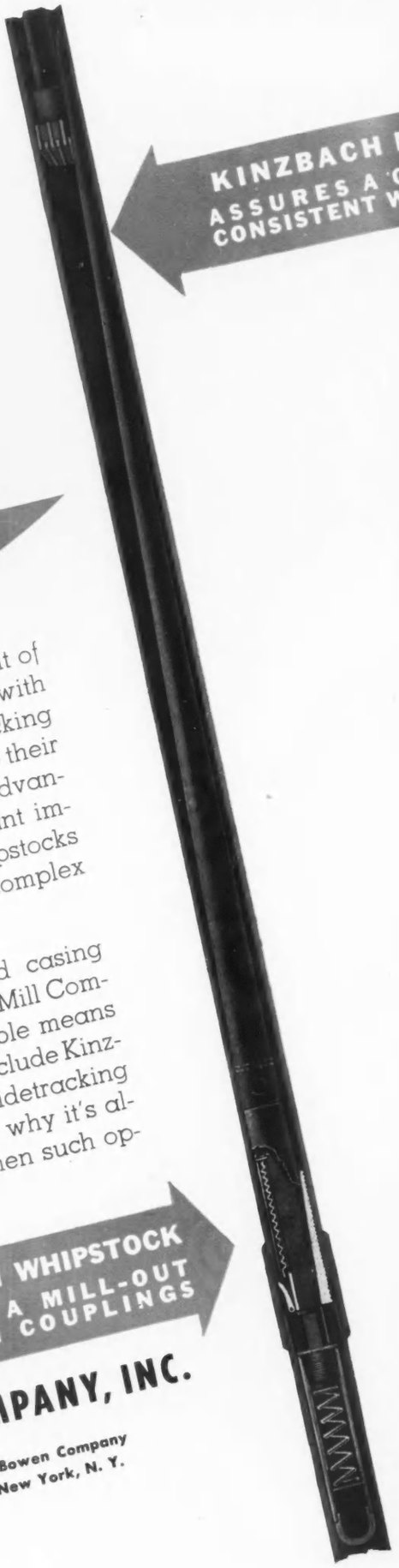
Engineering and Geological Data on U. S. S. R. European Fields—Continued from page 217

AREA AND FIELD	Location On Map	Year of Discovery	Gravity of Oil (API)	PRODUCING FORMATION		
				Age	Depth (Ft.)	Type Structure
Emba Area:	Page 235					
Baichunas	K-3	1933	....	Jurassic	.....	Salt Dome
Chernaya-Retchka	K-1	....	....	Jurassic	.....	Salt Dome
Dossor	J-3	1910	....	Jurassic	246–690	Faulted Dome
Dshaksymai	F-8	....	....	.....	.....	Faulted Dome
Iskine	K-2	1933	....	Jurassic	2195	Salt Dome
Kizil-Kudak	L-4	....	....	Jurassic	.....	Salt Dome
Koschagyl	L-5	1935	....	Jurassic	350–1200	Salt Dome
Kurgus	L-4	....	....	Jurassic	.....	Salt Dome
Kulsary	K-5	....	....	Jurassic	.....	Salt Dome
Makat	J-3	1915	....	.....	.....	Salt Dome
Novobogatinsk	K-1	....	....	Jurassic	.....	Salt Dome
Sagis	J-4	....	....	Lower Cretaceous and Middle Jurassic	328–2132	Faulted Dome
Shobarkuduk	G-8	....	....	.....	.....	Salt Dome
Georgian Area:	Page 223					
Malye Shiraki	E-9	1937	34–37	Lower Pliocene and Upper Miocene	980–7850	Anticlinal fold
Mirzaani	E-8	1930	34–37	Lower Pliocene and Upper Miocene	980–7850	Anticlinal fold
Grozny Area:	Page 223					
Adi Yurt	C-7	....	....	Upper Miocene	3650	Anticlinal fold
Ali Yurt	B-2	....	....	Middle Miocene	9185	Anticline
Bakovichi	B-1	....	....	Middle Miocene	.....	Anticline
Benoi	F-10	1930	41	Oligocene	3690	Anticline
Gorskaya Mt.	B-3	1936	....	Middle Miocene	3530	Anticline
Grozny, New	D-6	1912	....	Middle Miocene	7220–10200	Anticline
Grozny, Old	C-6	1893	....	Middle Miocene	7290–10200	Anticline
Gudermess	D-8, 9	....	....	Middle Miocene	3940–4595	Anticline
Makhkety	F-8	....	....	Middle Miocene	3280–3940	Anticline
Malgobek	B-1	1933	....	Middle Miocene	990–2300	Anticline
Voznessenka	B-2	1915	18–20	Middle Miocene	990–2300	Anticline
Kama River Area:	Page 231					
Chusovaskiye Gorodki	H-9	1939	21	Permian	3200	Buried reef
Krasnokamsk	H, I-5	1935	21–36	Permian and Upper Carboniferous	530–620 2950–3100	Anticline
Overiata	I-5, 6	....	21–36	Permian and Upper Carboniferous	.....	Anticonal
Polazninsky	G, H- 6,7	1939	21–36	Permian and Upper Carboniferous	3400	Anticlinal
Severokamsk	H-6	1938	21–36	Permian, Upper Carboniferous and Devonian	3200–5840	Anticlinal
Kuban-Maikop Area:	Page 227					
Abuzy	F-16	....	....	Oligocene	2500–4920	Monocline
Adaghum	D-10	1929	15–17	Upper Miocene	985	Anticline
Apersherson (Maikop)	G-17, 18	1909	33	Lower Miocene	1640–3480	Monocline
Asphalt Mountain	G-17	1936	37	Lower Miocene and Oligocene	2240–2950	Monocline
Kaluzhky	E-15	1927	....	Middle Miocene	.....	Monocline
Keslerovo-Varenikovo	D-10	1933	21–41	Upper Miocene and Oligocene	1148–1640 2625–3280	Anticlinal fold
Khadyzhi	G-17	1870	33	Lower Miocene and Oligocene	2240–3480	Monocline
Kura Tsitse	G-16	....	33	Lower Miocene and Oligocene	2250–2950	Monocline
Kutaiss	F-16	....	33	Lower Miocene and Oligocene	2240–2950	Monocline
Krymsky-Kudoko	D-10	1866	17–29	Middle Miocene	650–1640	Anticline
Shirokaya Balka	G-17	1909	33	Lower Miocene and Oligocene	2240–2950	Monocline
Suvorov-Cherkess	C-8	1912	33	Pliocene and Miocene	330–1475	Domal Uplift
Pechora Area:	Page 215					
Chibien	C-8	....	....	Devonian	.....	Anticlinal
Ust Kulom	C-8	....	....	Devonian	.....	Anticlinal
Yareg	C-8	....	....	Devonian	.....	Anticlinal
Ukraine Area:	Page 215					
Romny	H-4	1937	....	.....	.....	Dome
Ural-Volga Area:	Page 231					
Allaguvat	D-13	....	....	Lower Permian	1650–2085	Buried reef
Buguruslan	D-7	1937	....	Permian	985	Anticlinal
Ishimaevo	D-14	1932	....	Lower Permian	1640–2085	Buried reef
Kusiankul	D-14	1943	29	Lower Permian	1380–2490	Buried reef
Smakaevo	D-14	1932	29	Lower Permian	.....	Buried reef
Syzran	D-1	1934	31	Upper and Lower Carboniferous	2130 & 3280	Domal Uplift
Termen Yelga	D-14	....	....	Lower Permian and Devonian	2750	Reef
Tuimaza	A-9	1937	26	Carboniferous	3440–3775	.....
Verkne Buranchino	D-14	....	....	Lower Permian	1640–2085	Buried reef
Yablonovo	D-2	....	31	Upper and Lower Carboniferous	2130 & 3280	Domal Uplift

When they need

WHIPSTOCKS

"Set a Kinzbach" is the first thought of oil men everywhere



"Kinzbach Whipstocks" are the first thought of oil men everywhere when they are faced with such jobs as directional drilling, sidetracking junk or straightening crooked holes. Since their introduction 20 years ago, the original advantages have been augmented by constant improvements . . . today, Kinzbach Whipstocks meet every requirement of modern complex drilling methods.

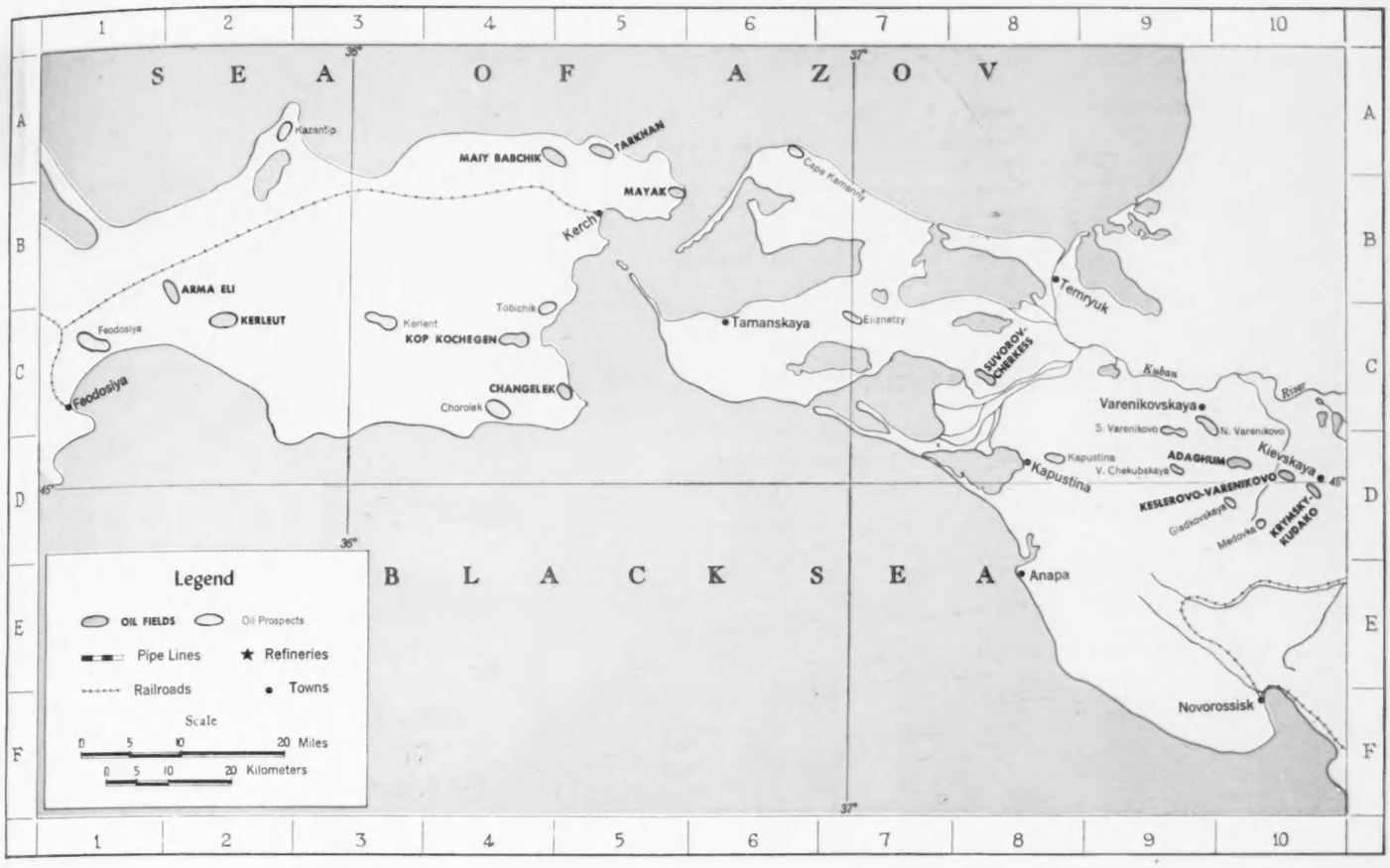
When windows must be cut in old casing strings, the Kinzbach Whipstock and Mill Combination offers the logical, dependable means of successfully completing the job. Include Kinzbach Whipstocks and Mills in your sidetracking operations. You'll quickly discover why it's always best to "Set a Kinzbach" when such operations become necessary.

KINZBACH TOOL COMPANY, INC.

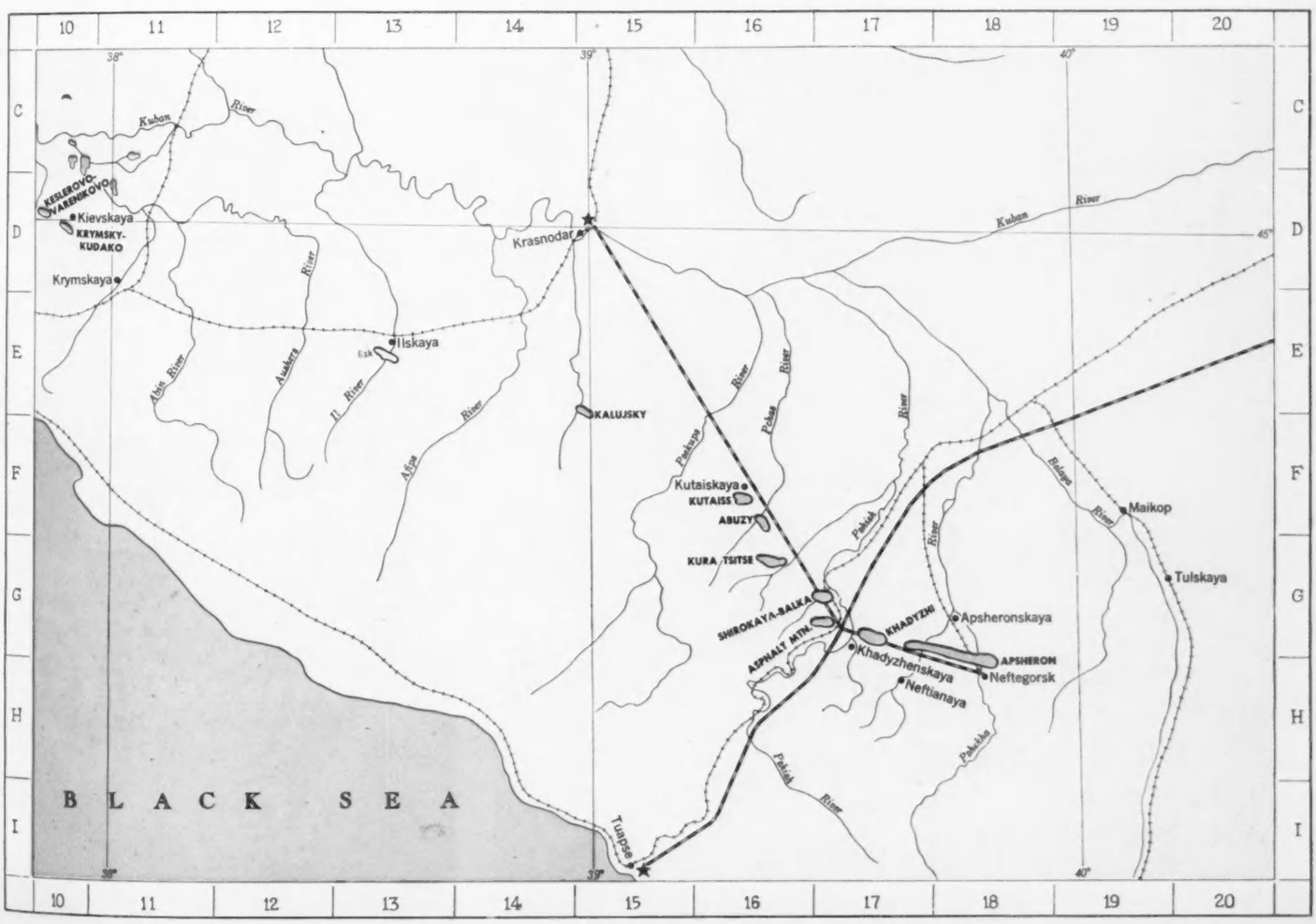
HOUSTON, TEXAS

California Representative: S. R. Bowen Company
Export Office: 74 Trinity Place, New York, N. Y.

U.S.S.R.—Crimea, Kuban-Maikop Areas

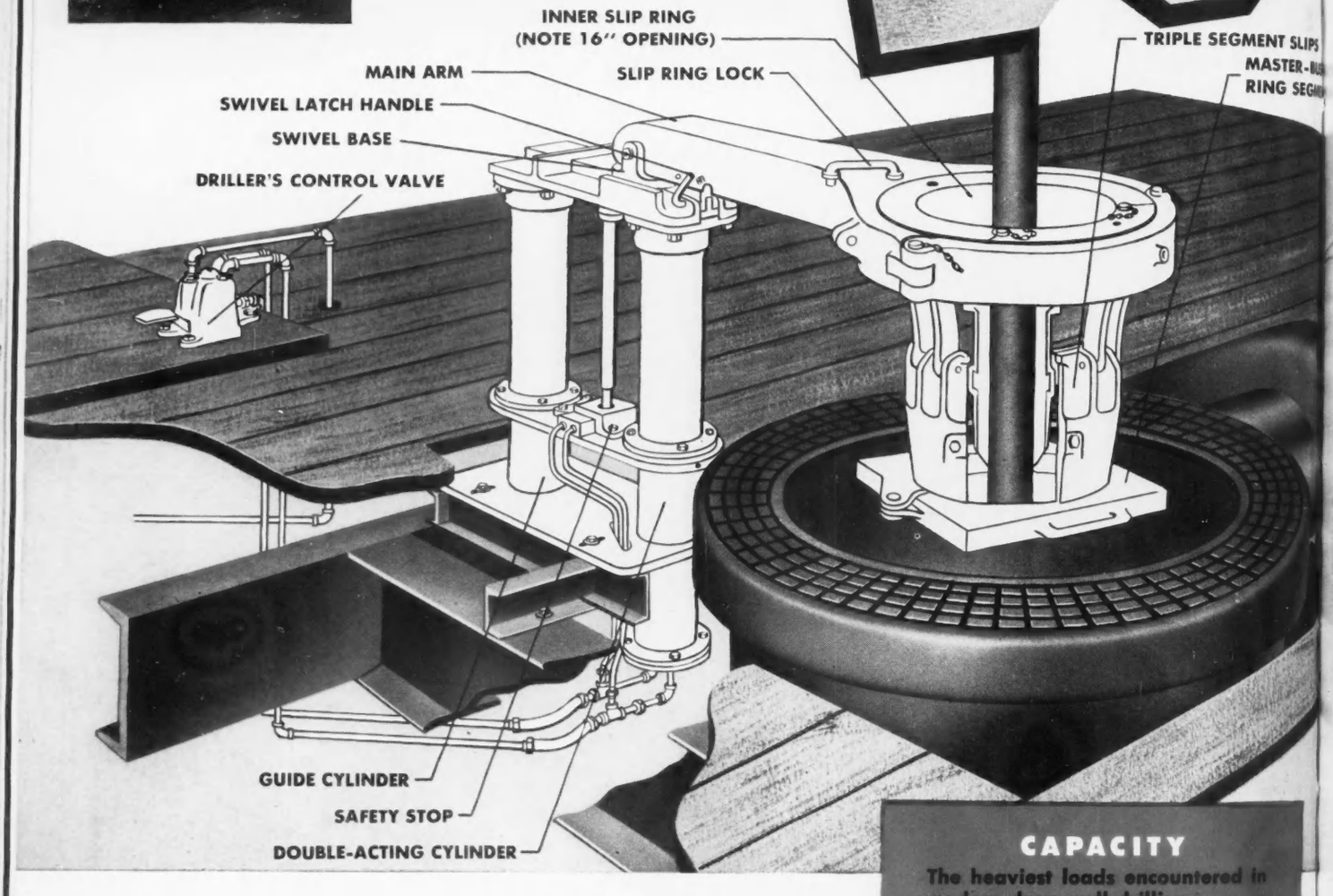


Continuation of Above Map, Same Scale



FASTER, EASIER with BJ

Driller's foot-actuated control valve, the simplest, most efficient type of control. The valve is so constructed that slips are either pressure-raised or pressure-set by simply depressing the one control pedal. With force applied to set slips as well as raise them, positive centering of drill pipe, tubing or casing is always assured.



With the new BJ Power Slips, running in or out of the hole is faster, smoother, better co-ordinated. They really show to advantage in speeding up costly round trips. And they represent a big stride toward greater safety and less labor. BJ Power Slips are designed for rough handling and heavy-duty operation on all types of rigs. They have been exhaustively tested and proved in the field. BJ Power Slips are establishing *new maximums in drilling efficiency.*

CAPACITY

The heaviest loads encountered in modern deep well drilling.

RANGE

One set of BJ Power Slips handles drill pipe, tubing, or casing in all sizes from 2⅛" to 7". Only slip bushings and inserts change for each size.

POWER SUPPLY

Air, steam or hydraulic. Simplicity and efficiency recommend pneumatic power. Any compressor of 16 cu. ft. per minute minimum capacity at 120 psi is suitable. On most rigs merely connect to windjammer.

ROUND TRIPS

Power Slips

One of the three unusually long slips. Greater dip area and proper tooth design of replaceable inserts mean positive, uniform grip without crushing or otherwise damaging drill pipe, casing or tubing, even when heaviest strings are being handled.

SIMPLE, RUGGED CONSTRUCTION

The heavy plate on top of the cylinders forms a swivel base for the main arm, which can be rotated either vertically or horizontally. A latch automatically locks main arm to base plate when mechanism is swung into operating position around drill pipe, tubing or casing.

The three slips are connected to slip ring by links that allow for flexibility and permit easy removal of slips. The slip ring, mounted in main arm on four roller bearings, can be rotated freely.

The two unitized master-bushing ring segments, beveled 30° at the top, guide slips into master bushing. Master-bushing rings *do not reduce full opening of rotary table;* full opening permits passing of all protectors, tool joints and couplings. Adjustable cushioned stops limit upward and downward travel of slips. Slips are pressure-locked in both raised and set positions; but in case of a power failure when slips are raised, the safety stop prevents slips from dropping.

(Right) These are the working positions for fast, smooth round trips. Slips are set or raised by a simple movement of the driller's foot lever. Slips are pressure-locked in both raised and set positions. In case of a power failure when slips are raised, the safety stop prevents slips from dropping.

(Above) Snaking slips from out-of-service position into working position with the catline is simple and fast. Note how main arm swings open on hinge pin, and how slip ring segment is locked to hinged arm for this operation. After dropping the mechanism into working position, the main arm is swung closed and the chained retaining pins are reinserted.

BJ

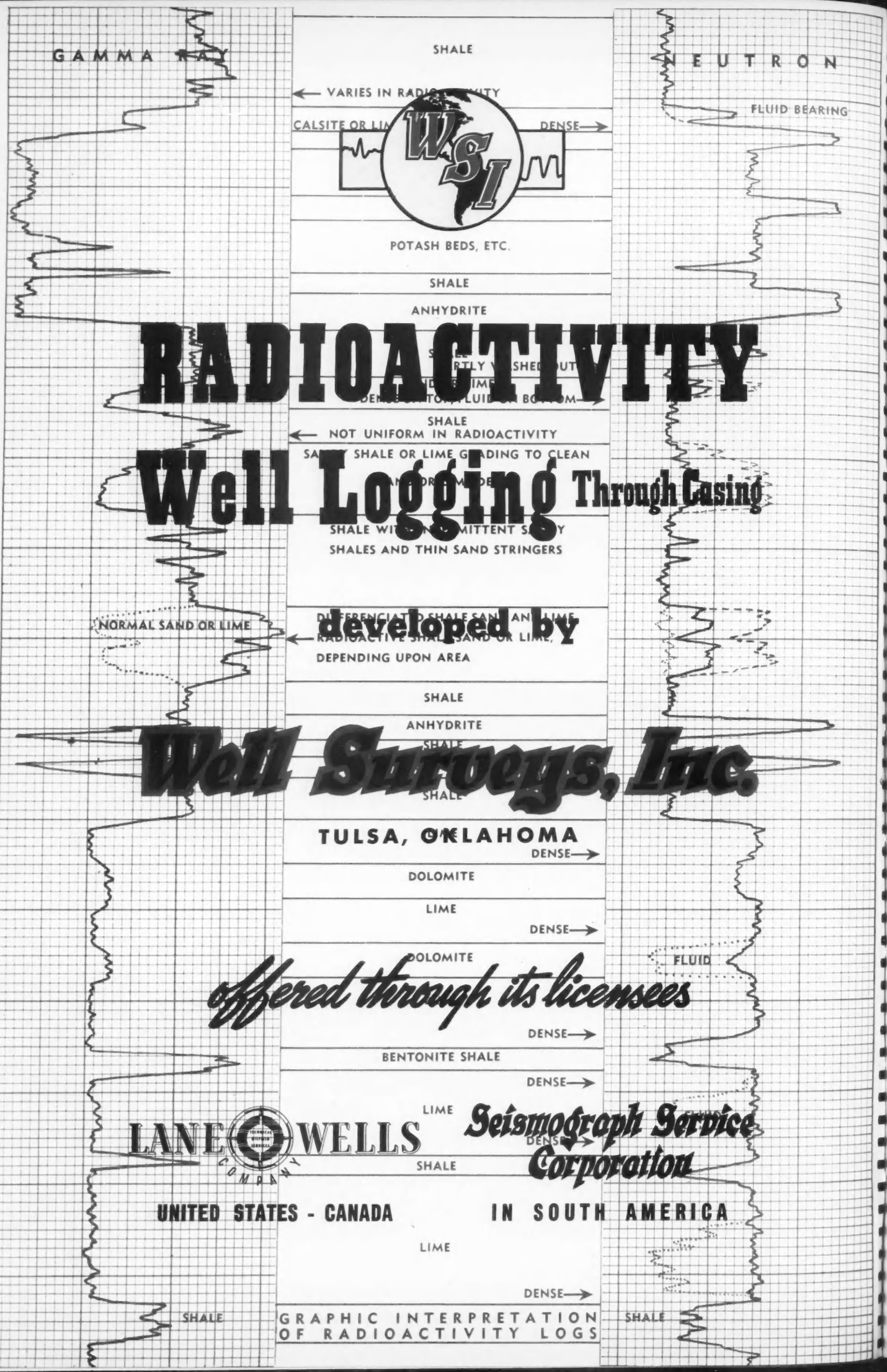
MEANS ENGINEERED OIL TOOLS

Byron Jackson Co.

MAIN OFFICE AND PLANT

LOS ANGELES 54, CALIFORNIA

Mid-Continent Office and Plant, Houston 1, Texas
Export Office, New York 17, New York
Branches In All Principal Oil Fields



RADIOACTIVITY

Well Logging Through Casing

developed by

Well Surveys, Inc.

TULSA, OKLAHOMA

offered through its licensees

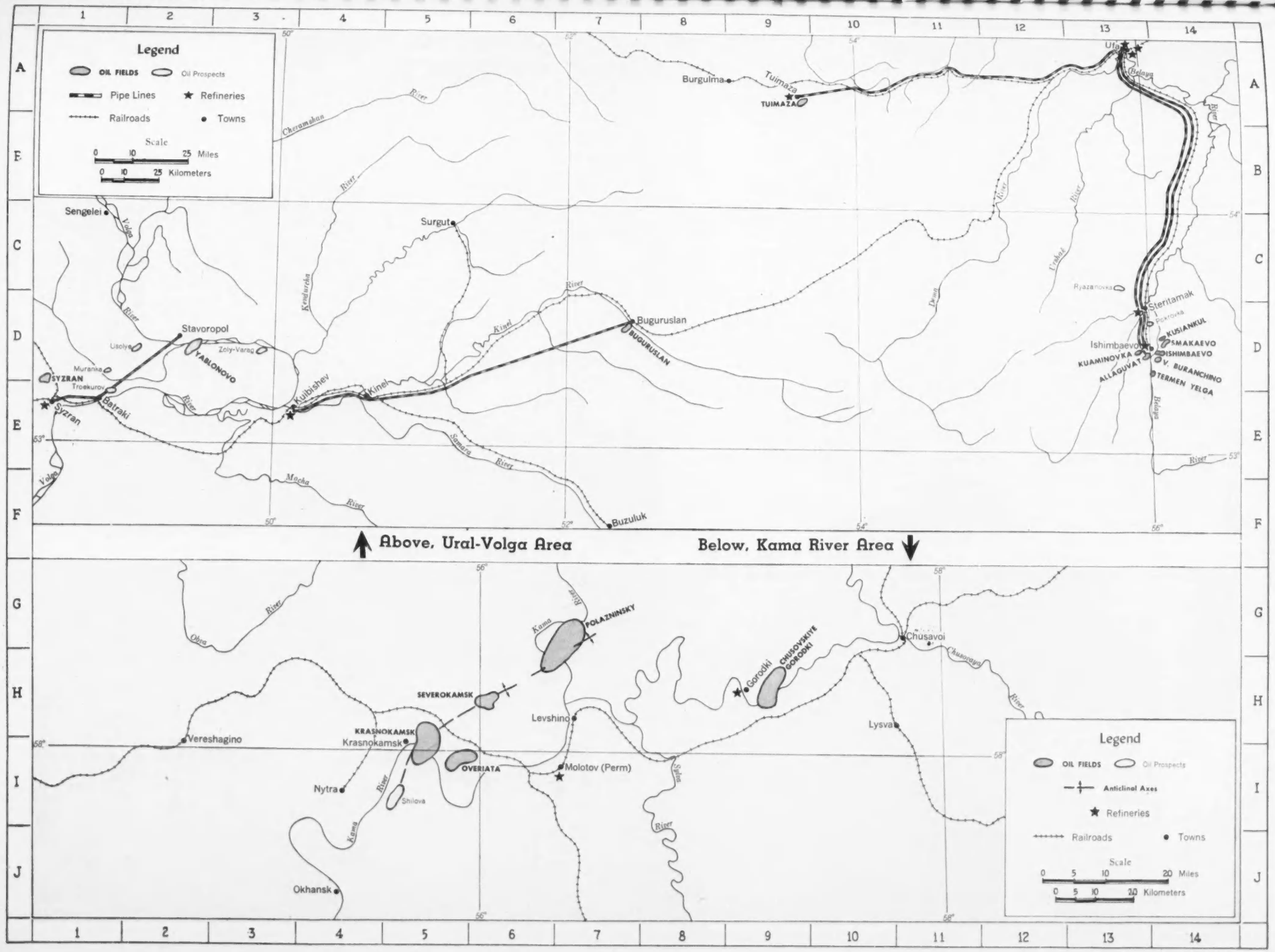
LANE WELLS COMPANY

UNITED STATES - CANADA

Seismograph Service Corporation

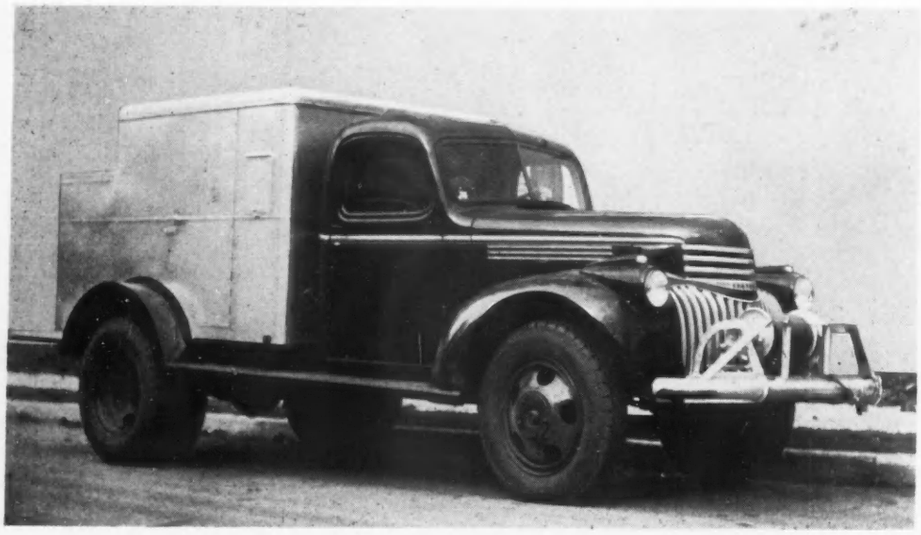
IN SOUTH AMERICA

U.S.S.R.—Ural-Volga, Kama River Areas



KING "FRONT END" WINCHES

The Original "Front End" Winch



Model 125 King Winch on Recording Truck

King Winches are the original front end winches, having been first built by request of geophysical exploration crews. King Winches are designed for "front-end" mounting being constructed of fabricated steel where extreme strength is required and light weight is an important factor. Three sizes are available: Model 125 for 1½ ton truck, Model 120 for 1 ton truck and Model 100 for ½ ton trucks and passenger cars.

The seismograph recording body shown was built by Koenig Iron Works—Body Division.

Model 100 King Winch on Ford Passenger Car

Model 100 King Winch is driven from the end of the engine crankshaft by means of a patented positive drive clutch which can be engaged or disengaged under load while the engine is running. This gives the winch a control similar to a friction clutch, with the added advantage of positive drive, eliminating clutch slippage. The Model 100 can be installed on any make of ½ ton truck and almost any make of passenger car.

KOENIG IRON WORKS

2214 WASHINGTON AVE. **HOUSTON 10, TEXAS**

U. S. S. R.—Continued

Buguruslan to Kuibyshev is reported to be under construction.

North of the Kama river fields an important gas field is reported to have been found at Cherdyn, near Berezniki, and Russians have spoken about the completion during 1945 of a 400-mile gas line from this field to the steel center of Sverdlovsk.

Other new gas fields have been discovered in the Ukraine, Daghestan, Baku and Kuban-Maikop regions. Neighboring towns are reported to be connected to some of these fields. In addition, Russia is to supply some of her Ukraine cities with gas from the Daszawa gas field of Poland, which is located in that part of Poland scheduled to become a part of the U. S. S. R. A 450-mile gas line from Daszawa to the towns of Kiev, Vinnitsa and Proshurov is reported under construction.

OIL REFINING FACILITIES

Since the U. S. S. R. has become more highly industrialized and mechanized in recent years than any other country besides the United States, she consumes all her own production. Consequently, a refining industry capable of handling all the crude produced has been built up. All the European producing districts have nearby refining facilities, and in addition refining plants have been constructed at other localities, principally along the Black Sea and the Volga River. Other plants have been built at Moscow, Orsk, Leningrad and other interior European locations.

Sufficient refining capacity also has been constructed in Asiatic U. S. S. R. to handle more crude than is produced there, so some oil is shipped into this area from European fields. Four refineries at Fergana process most of the oil produced in the Uzbek-Tadzhik-Kazakh area. Sakhalin production is processed in several plants located on the main land at Nikolaevsk, Komsomolsk and Khabarovsk, which are situated on the Amur River.

In all, the U. S. S. R. has approximately 40 refining plants, the more important of which are now equipped with cracking facilities.

OIL TRANSPORTATION

U. S. S. R. oil production is moved to refining centers by a combination of water, railroad and pipe line. Exclusive of natural gas lines, the principal Soviet trunk pipe lines total almost 3750 miles. Favored by the existence of the Caspian and Black Seas and the navigable Volga River, water shipments constitute an important phase of distribution. From pipe line terminals and water ports, crude oil and products are distributed by rail.

Oil and petroleum products from Baku is distributed from its southern location by three principal methods. Baku is connected to Batumi on the Black Sea by two pipe lines, from which point they are further distributed by water and then by rail. Another Baku shipping method is via tankers to Makhach Kala, and then by pipe line through a system that extends from Makhach Kala through the Grozny fields to Armavir, where it branches with one leg going to Tuapse on the Caspian Sea and the other extending 300 miles

U. S. S. R. Principal Pipe Line Data

ORIGIN	Terminus	Length (Miles)	Diameter (Inches)	Capacity (Barrels Daily)	Year Completed
Baku Area:					
Baku	Batumi	550	8	24,000	1905
Baku	Batumi	510	10	40,000	1928
Dagestan Area:					
Izerbash	Makhack-Kala	38	8	....	1939
Makhack-Kala	Grozny	12	95	38,000	1924
Makhack-Kala	Grozny	12	95	38,000	1935
Grozny Area:					
Grozny	Tuapse	10	385	....	1928
Grozny	Malgobek	8	56	....	1940
Grozny	Gorlovka (Nikilovka)	12	303	32,000	1932
Georgian Area:					
Mirzaani	Kachreti	8	20	....	1940
Kuban-Maikop Area:					
Neftegorsk (Maikop)	Krasnodar	8	67	....	1930
Emba Area:					
Guriev	Orsk	12	440	....	1935
Rakusha	Dossor	8	35	....	1930
Koschagyl	Makat	8	61	....	1935
Ukraine Area:					
Ploesti, Roumania	Odessa	10	250	....	1946
Daszawa, Poland	Kiev, Vinnitsa & Proskurov	..	450	Gas	1946
Ural-Volga Area:					
Ishimbaevo	Ufa	103	6	....	1937
Ishimbaevo	Ufa	103	6	....	1939
Buguruslan	Kuibishev	98	10	Gas	1943
Buguruslan	Kuibishev	98	10	Gas	1946
Syzran	Batraki	14	10	....	1937
Batraki	Stavropol	27	10	....	1940
Saratov gas fields	Moscow	500	10–12	Gas	1946
Yelshanka	Saratov	..	..	Gas	1942
Kama River Area:					
Cherdyn	Svedlovsk	400	..	Gas	1945
Turkmen Area:					
Krasnovodsk	Ashkabad	340	..	....	....
Sakhalin Area:					
Okha	Moskalvo	17	10	....	1941
Fergana Area:					
Gas fields	Andizhan	..	..	Gas	1945

Engineering and Geological Data on U. S. S. R. Asiatic Fields

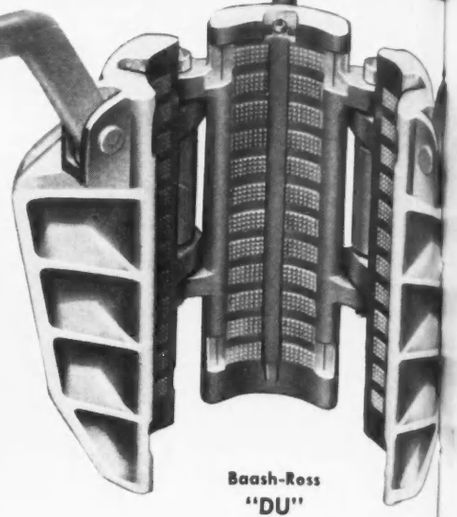
Area and Field	Location On Map	Year of Discovery	Gravity of Oil (API)	PRODUCING FORMATION		
				Age	Depth (Feet)	Type Structure
Sakhalin Island:	**Page 241**					
Ekhabi	C-3	....	....	Upper Pliocene	310–630	Anticline
Katangli	I-4	....	....	Upper Pliocene	2460	Anticline
Nutovo	E, F-3, 4	....	40	Upper Pliocene	260–2885	Anticline
Okha	C-3	1923	15–21	Upper Pliocene	300–775	Anticline
Polomai	E-3	....	....	Middle and Lower Pliocene	8858	Anticline
Vigrek	H-4	....	....	Upper Pliocene	120–200	Anticline
Turkmen Area:	**Page 239**					
Cheleken	B-4	1873	....	Pliocene	820	Faulted dome
Chikishlyar	D-5	....	....	Middle Pliocene	.....	.....
Nebit Dag	B-4	....	....	Middle Pliocene	.....	Anticline
Neftedag	B-5	1931	....	Middle Pliocene	....	Anticline
Uzbek-Kazakh-Tadzik (Fergana) Area:	**Page 239**					
Ak-Mecket	D-7	....	....	.....	.....	Anticline
Andizhan	D-7	....	....	.....	.....	Anticline
Barzik	C-7	....	....	.....	.....	Anticline
Changirtash	D-8	....	....	.....	.....	Anticline
Chimmon	D-7	1920	29	Eocene	1000	Anticline
Chu	A-8	....	....	.....	.....	Anticline
Dzhar-Kurgan	G-3	....	....	.....	.....	.....
Encunimsai	C-7	....	....	.....	.....	Anticline
Eno-Si-g	D-7	....	....	.....	.....	Anticline
Kamishbashi	D-6	....	....	.....	.....	Anticline
Kaudag	G-3	1934	....	Pliocene	.....	Anticline
Kim	D-6	....	29	Eocene	....	Anticline
Komosol	A-8	....	....	.....	.....	Anticline
Kulmen	C-7	....	....	.....	.....	Anticline
Mailisai	C-7	....	....	.....	.....	Anticline
Melnikovo	D-6	....	....	.....	.....	Anticline
Namangan	C-7	....	....	.....	.....	Anticline
Nefteabad	E-6	....	....	.....	.....	.....
Pavlan Tash	D, E-5, 6	....	....	.....	.....	Anticline
Pitausai	C-7	....	....	.....	.....	Anticline
Ristansanto	E-7	....	....	.....	.....	Anticline
Shor-Su	D-6	1927	....	Eocene	650	Anticline
Uch Kyzyl (Termez)	H-3	....	....	.....	.....	Anticline
Zarkent	C-5	....	....	.....	.....	.....

Baash-Ross News

BAASH-ROSS TOOL COMPANY · LOS ANGELES · HOUSTON · NEW YORK

OUR 26th YEAR

Baash-Ross
"2MB"
Rotary Slip

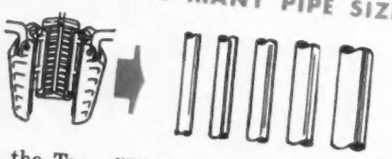


Baash-Ross
"DU"
Rotary Slip

There's a BAASH-ROSS SLIP for every holding job ...and for EVERY operator's preference

REGARDLESS OF THE METHOD OF SLIP OPERATION YOU PREFER—Whether one, two or three man—Baash-Ross engineers have developed pipe slips for every purpose to meet your particular operating requirements. For example, if you want a completely unitized slip for either one, two or three man operation, the Baash-Ross Type "DU" is the Slip you should buy. Or, if you standardize on two-man operation, then the Baash-Ross Type "2MB" is the Slip you want. In either case you can get the same basic advantages of wide-range adaptability, money-saving segmented liners, greater grip efficiency and easier handling.

ONE BODY FITS MANY PIPE SIZES



Both the Type "DU" and the Type "2MB" Rotary Slips embody the same money-saving advantage — by simply changing the liners, each basic body size is readily adapted to fit a wide range of pipe diameters. In contrast to conventional slips where a completely new set is necessary when changing from one pipe size to another, with Baash-Ross Slips you change only the liners — a quick, inexpensive operation — and the *same* body fits *many* pipe sizes. This one feature alone makes tremendous savings in inventory and maintenance costs!

SEGMENTED LINERS: Both "DU" and "2MB" Slips incorporate the new Baash-Ross segmented liners . . . multiple 4" liners in place of the conventional 12" or 16" full-length liners. Whether you use 12" slips or 16" slips, you need stock only *one* standard liner size to fit *both* bodies. Three 4" segments reline a 12" body, four a 16" body. The resulting simplified inventory is an important advantage at any location — and invaluable in export fields.

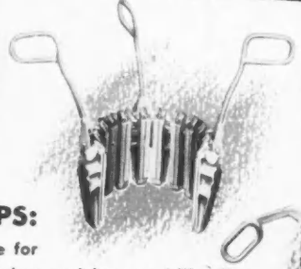
And you get longer life from your slip liners because there's no need to change the entire liner if only a portion is worn. With the 4" segments, simply switch worn segments with unworn ones, thus achieving practically new liner efficiency without replacing a single part. Or, if the segment is badly worn, replace just that segment and get additional service from the unworn ones. This feature cuts liner maintenance to the bone!

LIGHTWEIGHT: Note how Baash-Ross Slips are cored in the back to eliminate weight without sacrificing strength. Their light balanced design minimizes crew fatigue, boosts operating efficiency.

SAFETY LINER MOUNTING: In Baash-Ross Slips, liners are held by deep recesses in the body to insure transmission of *all* stresses — both of supporting and rotating the pipe — directly to the slip body. No bolts or pins to shear and cause the liners to drop in the hole. Yet the liners are easily replaced whenever required.

There are many other important advantages engineered into Baash-Ross Rotary Slips. Get all the facts on the many savings these Slips can make in your operations. See your Baash-Ross representative or write direct!

THESE BAASH-ROSS "SPECIAL PURPOSE" SLIPS PROVIDE UNIQUE ADVANTAGES



BAASH-ROSS DRILL COLLAR SLIPS:

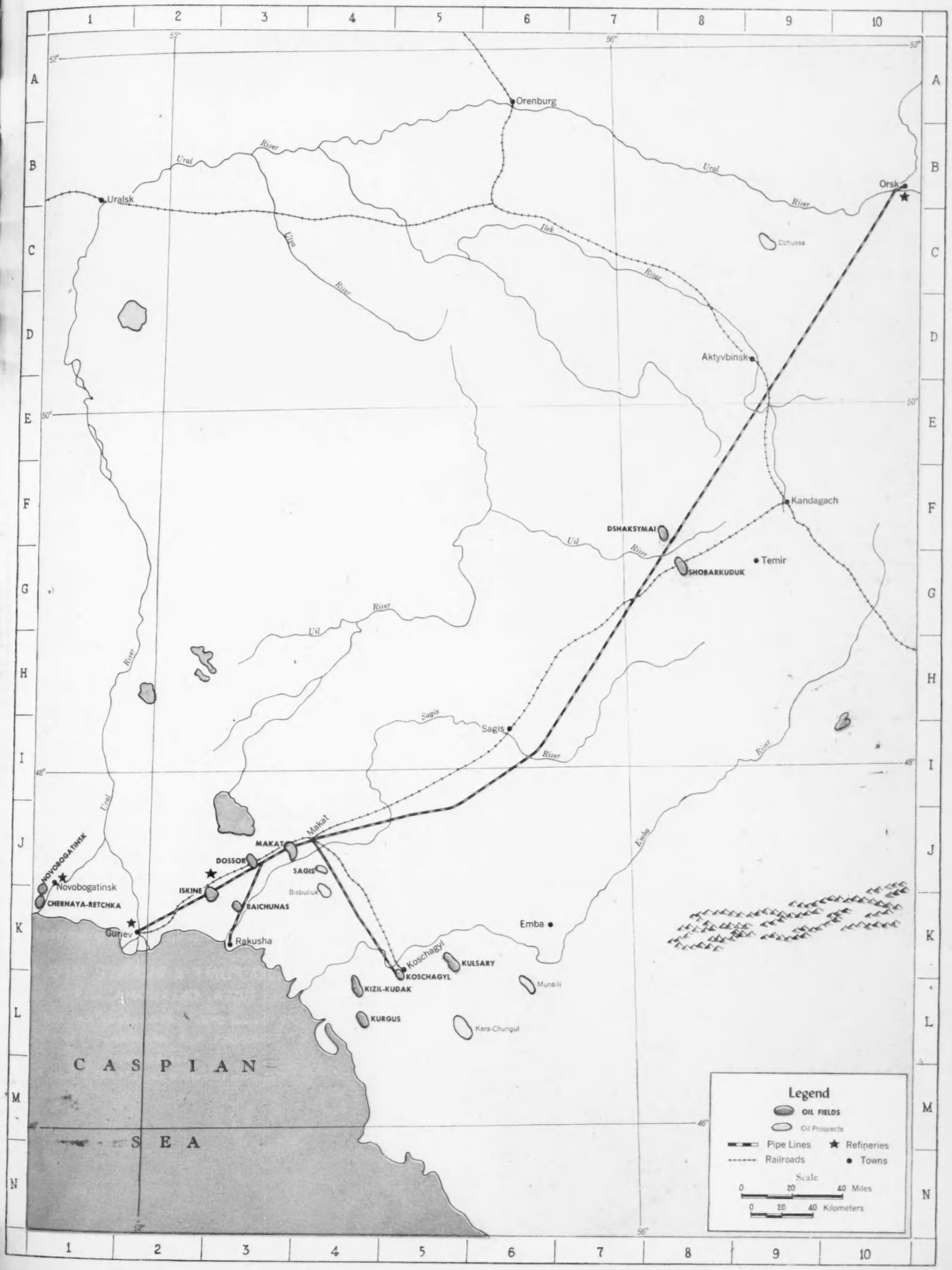
Ordinary fixed-diameter rotary slips cannot compensate for drill collar wear and their gripping efficiency becomes less and less as drill collar diameter decreases. Baash-Ross Drill Collar Slips are specially designed to overcome these risks. Consisting of many narrow segments flexibly hinged together, these slips wrap around the drill collar like a chain tong and readily compensate for wear. To protect against costly fishing jobs, these Slips should be on every drilling rig!

BAASH-ROSS CASING SLIPS:

The great weight of casing strings coupled with the thin wall of the casing make it imperative that grip pressure be distributed uniformly around the entire circumference of the casing in order to eliminate bottlenecking and damaged pipe. Baash-Ross Casing Slips consist of many narrow segments flexibly hinged together to wrap around the casing and take a uniform, full-circumferential grip. They are unitized to insure level setting of all segments, thus eliminating concentration of pressure. Safeguard your casing strings with this new Baash-Ross development!

The Slips described above are only a small portion of the complete line of Baash-Ross engineered drilling and production equipment. Write for the complete Baash-Ross catalog . . . or see your Composite Catalog

U.S.S.R.—Emba Basin Area



GASO

MADE IN OKLAHOMA

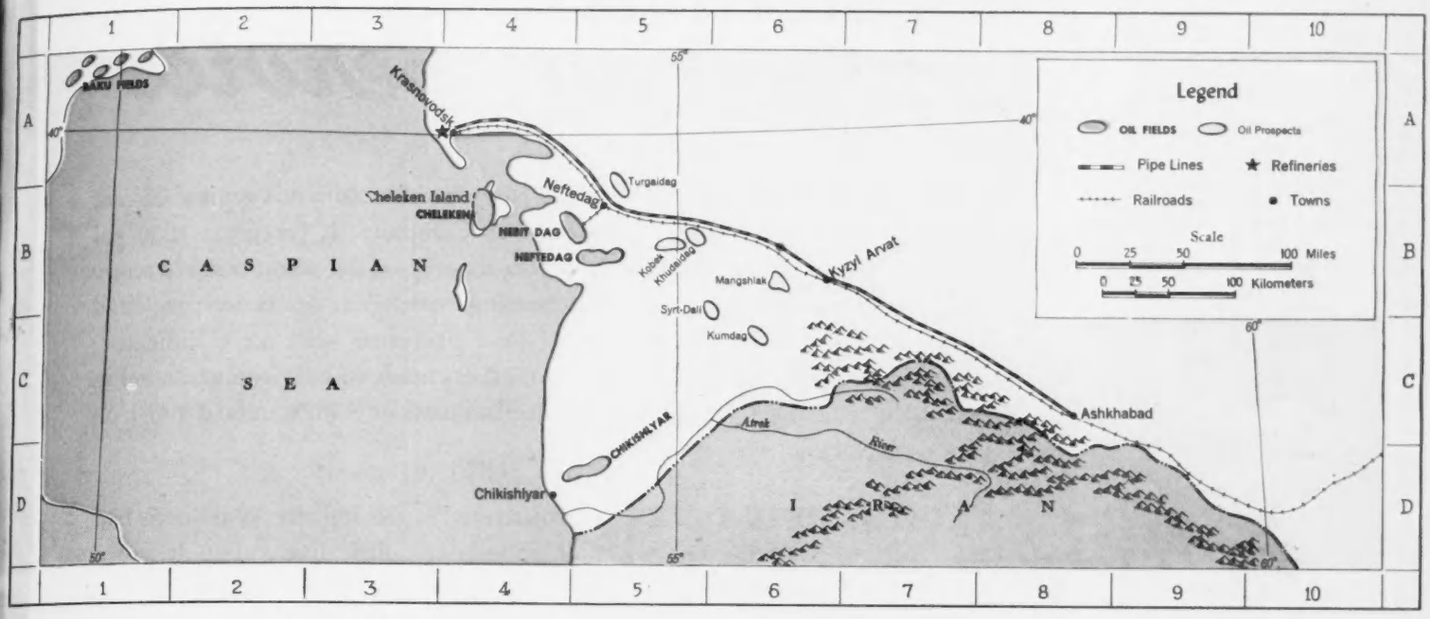
USED THROUGHOUT THE WORLD

Made in Oklahoma, Gaso Pumps are recognized wherever oil is produced as a symbol of the utmost in pump design and construction . . . In the universal language of performance they tell a daily story of economy, long life and trouble-free operation. Types to fit every need, each embodying the Gaso principle of streamlined engineering—fewer parts made extra-strong. Catalog on request.

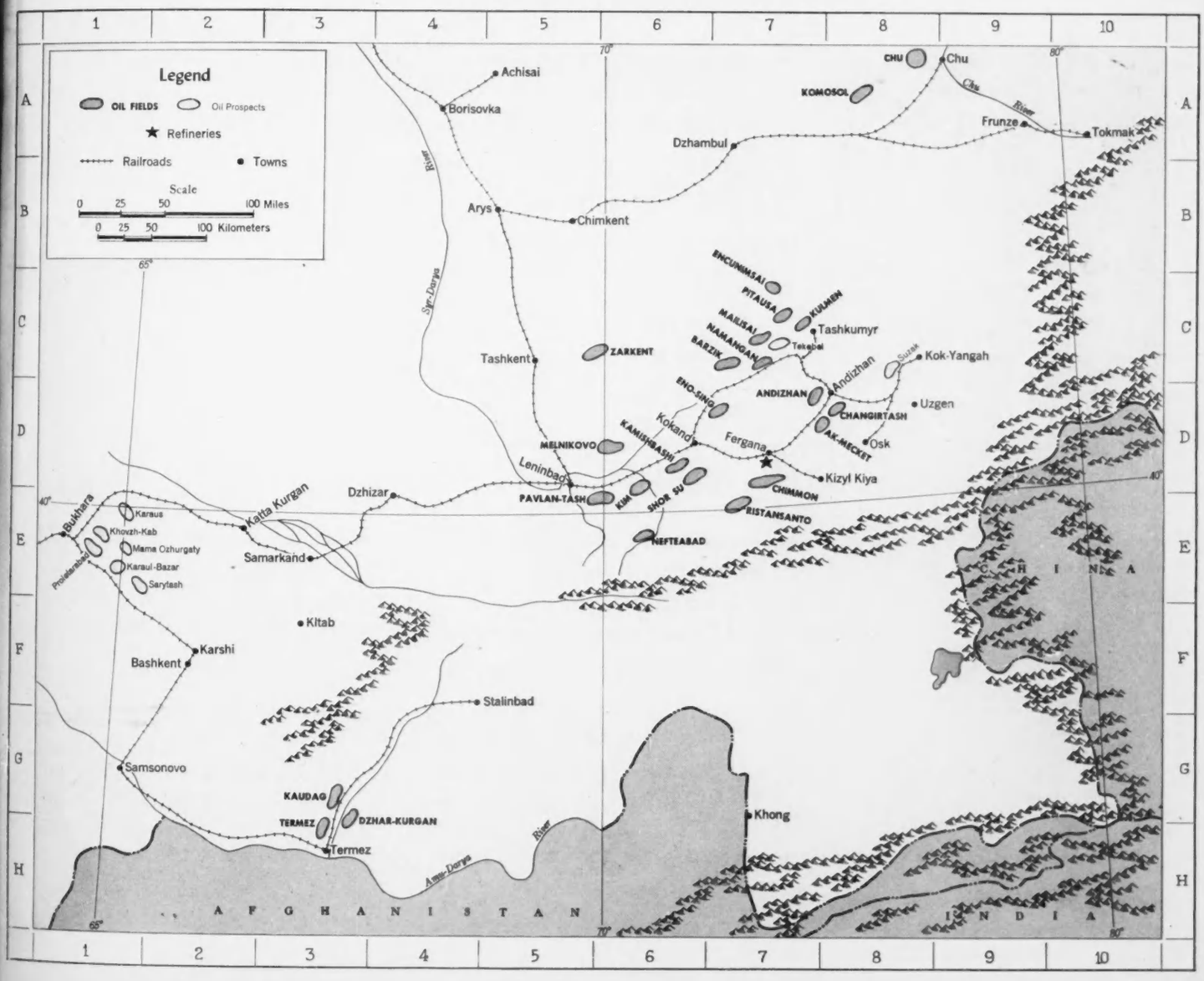
GASO PUMP & BURNER MFG. CO.
TULSA, OKLAHOMA, U. S. A.

Export Office: 149 Broadway, New York
Shreveport: W. L. Somner Co., 419 Lake St.
Los Angeles:
Production Equipment Co., 651-653 E. Gage Ave.

U.S.S.R.—Turkmen Area



Uzbek-Tadzik-Kirgiz Areas



WALWORTH VALVES *for...*
Petroleum Service

PIPE LINE VALVES . . . The 16-inch valve shown is typical of cast steel pipe line valves made by Walworth Company. It features: 1000 psi working pressure — 1800 psi test; double discs; parallel seats; outside screw and yoke bonnet construction; ball bearing bevel gear operation; stellited seats and discs; stem and bevel gear dust protector with stem indicator; flanges faced and drilled. This line, and others made of cast iron and steel in gate, plug, and check types, meet all requirements of API Standard 5-G-1 on pipe line valves.

FLOW LINE VALVES . . . Illustrated is the regular Walworth No. 85, Flanged, 5000 WOG — 10,000 pounds test flow line valve. It incorporates all the latest improvements. It has double discs; non-rising stem; reinforced body; and stellite-faced seats and discs. The valve can be repacked under pressure in either open or closed position. Walworth flow line valves are available in a full range of types and sizes.

LUBRICATED PLUG VALVES . . . This type of valve offers many advantages: direct port opening; quarter turn opens or closes valve; dead tight shut-off; freedom from attack by line fluids; pressure sealed. They are available in sizes $\frac{1}{2}$″ to 24″ for pressures from 125 to 5000 psi, and for vacuum requirements.

BRONZE VALVES . . . The Walworth Company manufactures a complete line of bronze valves in gate, globe, angle, and check types. No. 225P, shown here, has stainless steel seats and discs heat treated to 500 Brinell hardness. They can be closed on scale, sand, and grit without injury. These valves will give tight, positive shut-off, even after years of service. They are available in both globe and angle types (angle type No. 227P) in sizes from $\frac{1}{4}$″ to 2″, and are recommended for 350 pounds steam pressure, maximum temperature 550F, and 1000 pounds non-shock service on cold water, oil, gas, or air.

STEEL VALVES . . . Walworth Steel Valves are noted for their deep stuffing boxes; streamlined ports; extra strength steel walls; and the exact design, metallurgy, and construction of yoke nuts, bonnet bushings, gland followers, and other vital parts to assure better service for a longer period of time. Valves are made in a complete line of types and sizes — specifically engineered for the particular service for which they are recommended.

WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

U. S. S. R.—Continued

northwest to Rostov and Nikitovka. Daghestan and Grozny oil can move through this same pipe line system. Still another principal distributing means for Baku petroleum is by tanker up the Caspian Sea and the Volga River almost all the way to Moscow.

Outside of the pipe lines that transport Caucasian oil, the next most important system is the 440-mile pipe line that extends from the north edge of the Caspian Sea through the Emba district to the interior town of Orsk.

Crude oil produced in fields near Ishimbaevo fields of the Ural-Volga area move to the refining center of Ufa via two 100-mile pipe lines. The Tuimaza field also is connected to Ufa refineries by pipe line. Short pipe lines connect fields in the Volga River Bend territory with refineries and river terminals.

OIL ADMINISTRATION

An order issued by the Praesidium of the U.S.S.R. Supreme Council on March 4, 1946, separated the administration of the Soviet petroleum industry into two All-Union Commissariats. This action was a breakaway from the principle heretofore strictly observed of having the administration of the Russian oil industry under a single leadership.

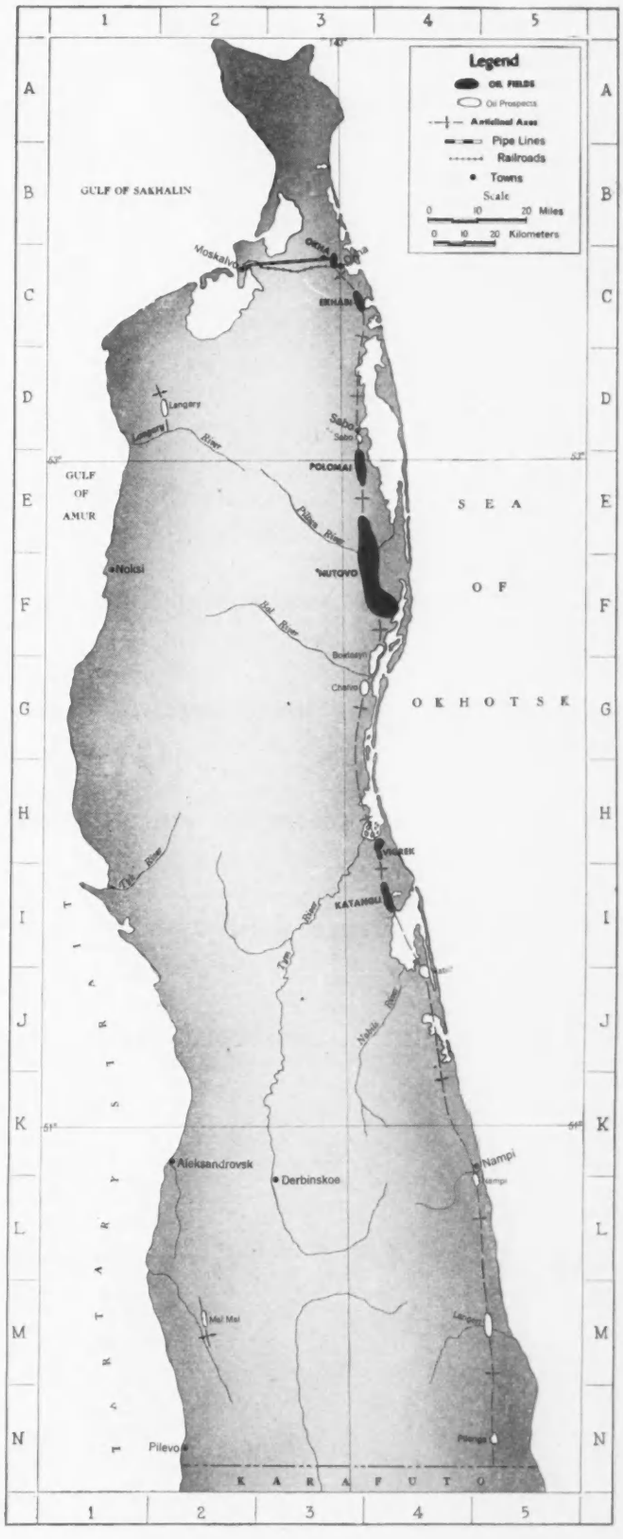
Under the new setup the Russian oil industry, for administration purposes, was divided into two regions—the southern and western regions, comprising the enterprises and organizations for crude oil production and refining and for oil machinery building of the Caucasus, the Ukraine and the central areas of the Soviet Union; and the eastern region, covering the same functions for the Urals, the Volga region, the Far East, Kazakhstan, Uzbekistan and Turkmenia.

The aim of the reorganization is to obtain maximum efficiency and speed in reaching the 60 million-ton goal set by Generalissimo Stalin for the country's annual crude oil output under the new Five-Year Plan (1946-1950).

Data on U. S. S. R. Crude Oil Refineries

LOCATION	Number of Refineries	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Plant
European Refineries:				
Baku	5	375,000	50,000	Skim-Crk
Batumi	1	2,000		Skimming
Berdyansk	1		5,000	Cracking
Buguruslan	1			
Chusovskiye-Gorodki	1	28,000	5,000	Skim-Crk
Gorki	1		10,000	Cracking
Grozny	3	150,000	50,000	Skim-Crk
Guriev	1			
Ishimbaevo	1	Small		Topping
Iskine	1	Small		Topping
Kazan	1			
Kherson	1		5,000	Cracking
Krasnodar	1	25,000		Skimming
Kuibishev	1			
Leningrad	1		5,000	Cracking
Makhack-Kala	1	2,000		Skimming
Molotovo (Perm.)	1	12,000	4,000	Skim-Crk
Moscow	3		12,800	Cracking
Novobogatinsk	1			
Odessa	1		5,000	Cracking
Orsk	1	28,000	5,000	Skim-Crk
Saratov	1		35,000	Cracking
Sterlitamak	1	10,000		Skimming
Syzran	1			
Tbilisi (Tiflis)	1			
Tuapse	1	35,000	10,000	Skim-Crk
Tuimaza	1			
Ufa	1	28,000	5,000	Skim-Crk
Ukhta	1	Small		Topping
Yaroslavl	1	9,000	4,000	Skim-Crk
Asiatic Refineries:				
Fergana	4	40,000	10,000	Skim-Crk
Irkutsk	1			
Krasnovodsk	1	4,000	3,000	Skim-Crk
Khabarovsk	1	4,500	3,500	Skim-Crk
Komsomolsk	1	4,500	3,500	Skim-Crk
Krasnoyarsk	1			
Nikolaevsk	1	4,500	3,500	Skim-Crk
Okha	1	Small		Topping
Vladivostok	1			

SAKHALIN ISLAND (RUSSIA)



The Yardstick:

accuracy of interpretation

The yardstick for measuring the value of any seismograph exploration service is *accuracy of interpretation* . . . either condemning or approving acreage. To those operators planning an exploration campaign we issue an invitation to investigate our record of operations, which provides unquestionable proof of the accuracy of our interpretations.

SEISMIC EXPLORATIONS, INC.

Gulf Building, Houston, Texas

Established 1932

U.S.S.R.—Eastern Siberia

Financing the Oil Industry

Whether in the Mid-Continent, Gulf Coast, or Rocky Mountain areas, Republic is there. . . . Because the Oil Industry knows that Republic knows Oil, this bank has become one of the nation's largest lenders to petroleum interests. Such leadership is no accident. It is a responsibility that is always uppermost in the minds of all the members of Republic's petroleum department, from bank officers to engineers . . . the men who have spent years studying your needs.

REPUBLIC

NATIONAL BANK *of* DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORP

MIDDLE EAST

GENERAL OUTLOOK

THE MIDDLE EAST area is scheduled to become an important factor in the international petroleum picture within a relatively short period of time. A daily production of more than 750,000 barrels, twice its prewar rate, is definitely indicated in view of additional facilities now being constructed. Daily production of the region may reach 1,200,000 barrels within a few years, a total 3 to 4 times greater than its prewar rate if two additional pipe line projects now up for consideration go through. A number of sources have predicted this region is to become the center of world oil production, and results to date plus the fact that the potentialities of the region are hardly scratched indicate this will depend upon how quickly the companies owning concessions in the territory want to develop them.

The Middle East production comes from the countries of Iran, Iraq, Kuwait, Saudi Arabia, Bahrein, and Qatar. Other countries, such as Palestine, Lebanon, Syria, and Trans-Jordan have not yet been proved productive. All the oil fields are centered around the Persian Gulf, with the exception of the Iraq fields.

PRODUCTION TRENDS

The war years saw the production of the region increased materially. Prior to the war, the Middle East area produced an average of about 325,000 barrels daily. Output rose to 400,000 barrels per day by the beginning of 1944, and by the first of 1946 had climbed to 588,000 barrels daily. Production of the Middle East will be higher during 1946. New facilities completed recently in Saudi Arabia and Kuwait will raise output during 1946 by more than 50,000 barrels. This means the Middle East will be producing 640,000 barrels daily, or twice the amount it produced during 1938.

Further increases are certain in view of announced plans for the construction of additional pipe lines. Iraq's 100,000 barrels per day production will be doubled when a pipe line now under construction is completed, probably sometime in 1947. Meanwhile, Qatar may enter the producing picture, adding 20,000 barrels more daily if a short pipe line is built to connect its lone shut-in field with the Persian Gulf waters. Thus, it is definitely indicated that production of the Middle East will be around 760,000 barrels per day by the end of 1947.

Meanwhile, there is talk of constructing still another line from the Kirkuk field in Iraq, and of constructing a "big inch" pipe line from the Saudi Arabia fields to the Mediterranean Sea. If these lines are built. Iraq's production may reach 300,000 barrels, and that of Saudi Arabia-Bahrein 375,000 to 475,000 barrels daily. On this basis, the production for the whole Middle East country will reach 1,110,000 to 1,210,000 barrels daily, almost four times its prewar level.

Middle East Crude Oil Production Trend

(Figures in barrels per day)

COUNTRY	Jan. 1, 1944	Jan. 1, 1945	Jan. 1, 1946	PROSPECTIVE TREND	
				Definite[1]	Probable[2]
Iran	275,000	357,000	385,000	385,000	385,000
Iraq	90,000	90,000	100,000	200,000 in 1947 due to completion of new pipe line.	300,000 by 1950 due to possibility of another new pipe line.
Kuwait				30,000 during last half of 1946 due to completion of pipe line.	30,000
Qatar				20,000, perhaps in 1947	20,000
Saudi Arabia-Bahrein	35,000	60,000	103,000	125,000 by end of 1946	375,000 to 475,000 if pipe line laid to Mediterranean Sea.
Total	400,000	527,000	588,000	760,000 by end of 1947.	1,110,000 to 1,210,000

[1] Includes only those plans for additional pipe lines definitely scheduled. [2] Includes only those plans for additional pipe lines that are under study.

Wells of the Middle East have an amazingly high producing capacity. Present out of 588,000 barrels daily is coming from a very small number of wells. For example, Iran's output of 385,000 barrels comes from some 50 active wells, constituting an average output of 7,700 barrels per well per day; and Iraq's 90,000 barrels per day is being produced from only 10 wells. Further testimony as to the productivity of the wells is indicated by the fact that at least three individual wells in Iran have produced over 50 million barrels. Other wells in the region probably will have similar recoveries, but they are not yet old enough to reach this figure.

The prospective gains in producing rates can be fulfilled with the drilling of an astoundingly small number of wells. This is due to the large productive capacity of the wells and the enormous shut-in producing capacity of existing wells.

The production trend in the Middle East is toward deeper horizons as it is along the Texas and Louisiana Gulf Coast. Many of the rigs now in operation are being replaced by larger rigs capable of testing possible oil sands at depths of 10,000 feet and below. Many prospects already outlined by geophysical work are expected to be drilled during 1946 and 1947 with much of the field activity centered on the restoration of wells plugged as a safe-guard against the possibility of falling into enemy hands.

HUGE CRUDE RESERVES

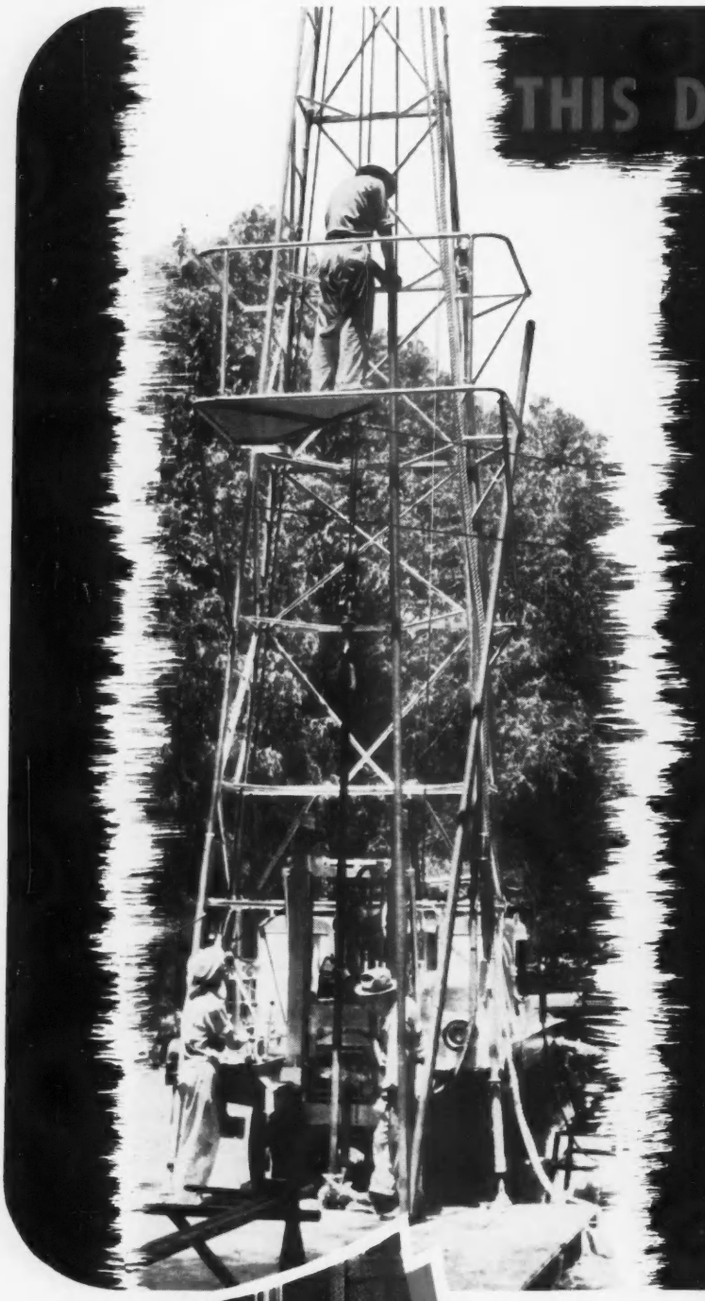
An amlost unbelievable amount of crude oil reserves have been proved in the area from a surprisingly small amount of prospecting and development. An American Technical Oil Mission to the Middle East in February, 1944, reported reserves of the area in this way:

COUNTRY	CRUDE RESERVES (Billions of Barrels)	
	Actually Proved	Indicated but Not Developed
Iran	5 to 6	6 to 7
Iraq	4	5
Saudi Arabia-Bahrein	2	4 to 5
Kuwait	4	9
Qatar	½	1
	15½ to 16½	25 to 27

The 15½ to 16½ billion barrels of proved reserves is not far below the 20 billion barrels credited to the United States. The results are incredible, since the discoveries have been made through the drilling of less than 150 wildcats.

FUTURE POTENTIALITIES

The future potentialities of the region are enormous. A large number of favorable prospects are as yet undrilled, and vast areas so far are practically unexplored. Therefore, it appears that the Middle East eclipses even the United States in future oil potentialities. Some estimates have been made that the potential reserves of the area exceed 100 billion barrels and may total as much as 200 billion. Obviously, any attempt to appraise the prospective areas of the region must be highly speculative. However, the astounding results in developing proved reserves and the exceptionally large producing capacity, definitely indicate huge possibilities.



THIS DRILL WORKS 27⅓ HOURS A DAY!

There are 27-1/3 hours in the working day of the Sullivan 200 Drill—3-1/3 extra hours that increase the day's drilling 200 feet without adding a penny to labor costs.

It's the automatic chuck, one of the many exclusive features of the Sullivan 200, that adds these "free" hours to the working day. With the automatic chuck, hand set chuck screws are eliminated and the time ordinarily spent in loosening and tightening these screws is utilized instead for actual drilling. Rods are released or grasped by the hydraulic feed mechanism without stopping rotation. On an average drilling job, that's 200 minutes or 3-1/3 hours, saved every 24 hours. At a foot per minute, this adds up to 200 extra feet drilled every day.

The Sullivan Model 200 Drill Rig is a medium weight drill for deep structure testing or shallow slim-hole production drilling. It has a hydraulic drill table retracting device, a built-in hydraulic feed mechanism and hydraulic cylinders for raising and lowering the mast, features found only on Sullivan Motorized Drill Rigs. Write now for complete information. Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Company, Ltd., Dundas, Ontario.

SULLIVAN

MODEL "200" MOTORIZED DRILL RIG

. . . for deep structure testing or shallow slim-hole production drilling—up to 2,500 feet

CLAREMONT, N. H. MICHIGAN CITY, IND.

MODEL 37—For shot hole, shallow structure testing or blast hole drilling. Capacity 1200 feet of 2" core or 750 feet of 6" hole.

MODEL 300—Truck mounted, portable for slim-hole production drilling. Capacity 40,000 lb. drilling string.

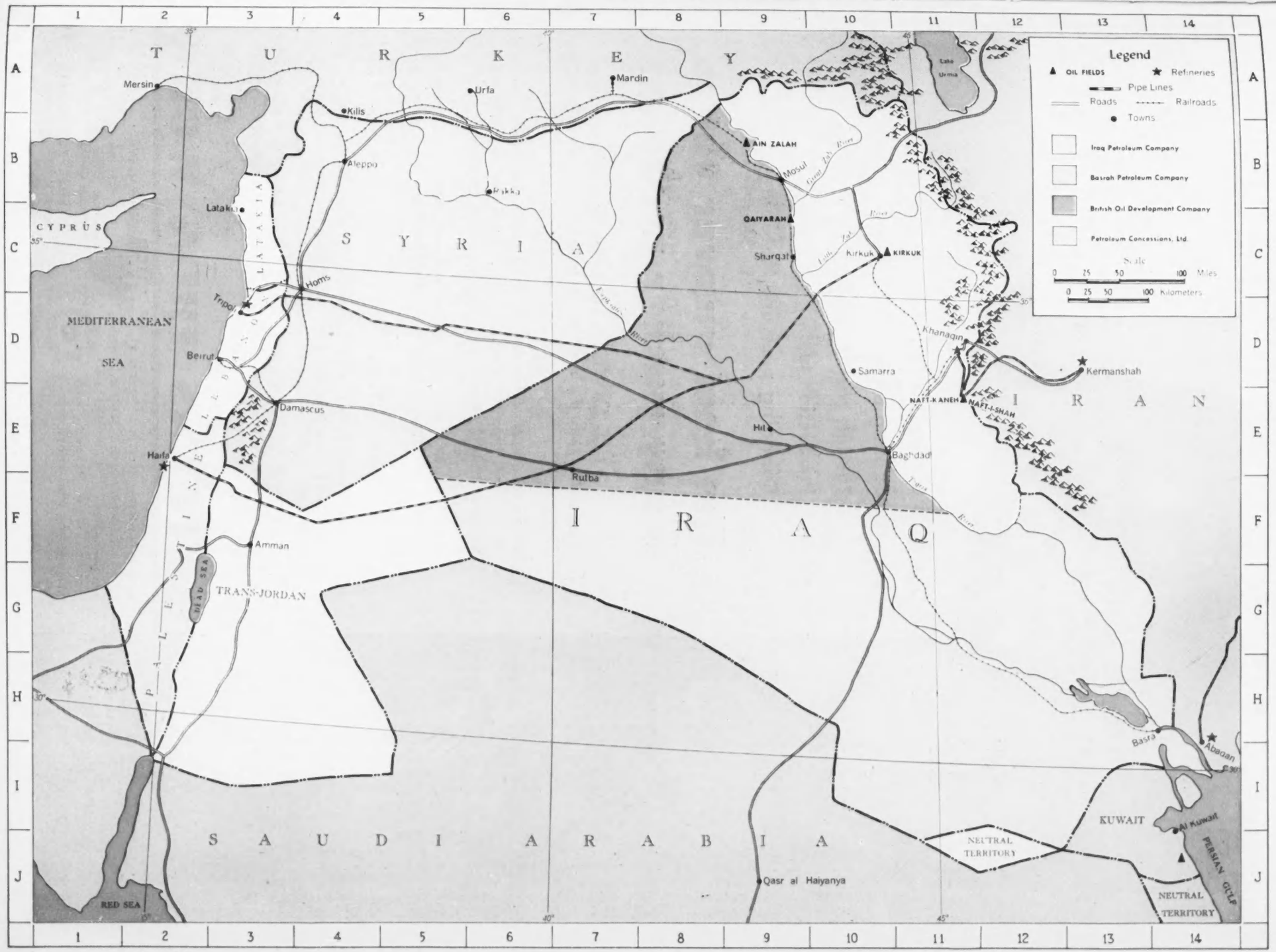
THE AUTOMATIC CHUCK
Makes the Difference!

PRODUCTS

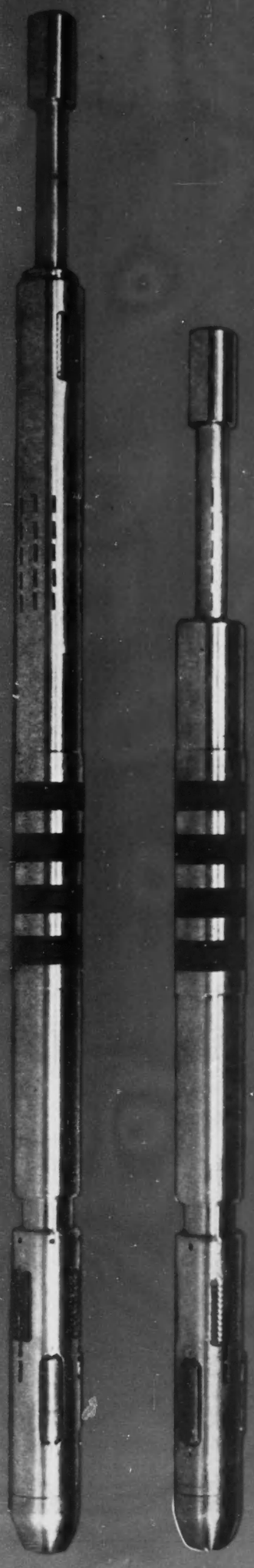
Portable and Stationary Air Compressors • Rock Drills • Portable Hoists • Portable Safety Lighting Cable for Derricks.

OFFICES

Chicago, 307 N. Michigan Ave. • Dallas, 1914 Commerce St. • Denver, 1815 California St. • Los Angeles, 2900 Santa Fe Ave. • New York, 30 Church St. • San Francisco, 145-10th St. • St. Louis, 2639 Locust St.



MIDDLE EAST—Concessions



TIW Type JSA Hook Wall Control Head PACKER

For

Setting Screen

Sealing off leaky casing

Testing casing for leaks

Production tests

Confining pressure to tubing

The best answer yet to many packer problems

Because of their adaptability and simplicity in setting, control head packers are the best packers to use under a wide variety of conditions.

When this type packer is indicated, many operators choose the T. I. W. Type JSA Packer. They have found from past experience that it gives the most dependable service.

If you haven't yet tried the new Type JSA Packer, contact your T. I. W. Representative — Find out why it is the leader in its field.

Left: T. I. W. Type JSA Hook Wall Control Head Packer. Notice the large area slotted valve that prevents fluid cutting, the four packer rings that assure a tight seal, and the recessed slips that can't be damaged while going in the hole. Extreme Left: The same type of packer with the addition of hold-down slips that keep the packer compressed even if weight is taken off the tubing.

TEXAS IRON WORKS

MANUFACTURERS OF: T.I.W. Portable Rigs . . . T.I.W. Safety Joints . . . T.I.W. Rotary and Casing Slips . . . T.I.W. Grief Stem Safety Valves . . . T.I.W. Packers for every purpose . . . and many other oil field tools.

GENERAL OFFICE AND MAIN PLANT: 1401-1423 Maury Street, Houston 10, Texas. Other Shops at Victoria and Corpus Christi.

EXPORT REPRESENTATIVE: Val R. Wittich, 30 Rockefeller Plaza, New York, N. Y.

IRAQ

OIL CONCESSIONS

IRAQ Petroleum Company and its subsidiaries hold virtually all concessions in Iraq. (See map, page 247.) The parent company owns a 30,000-square mile concession which runs 75 years from 1925; Basrah Petroleum Company, a subsidiary, together with British Oil Development Company holds all of Iraq not covered by Iraq Petroleum's grant (90,000 square miles), running for 75 years from 1938. Kanah Petroleum Company has a small concession near Kanah; Petroleum Concessions, Ltd., an affiliate of Iraq Petroleum, has a concession covering all of Syria (76,000 square miles) but not including Lebanon. With exception of a 378-square mile area on the west side of the Dead Sea, held by Jordan Exploration Company, Ltd., Iraq Petroleum holds the concession on all of Palestine (28,000 square miles). Petroleum Development (Trans-Jordan), Ltd., is reported to have applied for licenses covering about 17,500 square miles in Trans-Jordan.

REFINING

The largest oil refinery in the Mediterranean area is located at Haifa, Palestine. This is the 90,000-barrel plant of Consolidated Refineries, Ltd., which is jointly owned by Anglo-Iranian Oil Company, Ltd., and Anglo-Saxon Petroleum Company (Shell), with Anglo-Iranian in charge of plant management.

This plant was originally designed for the refinery of between 40,000 and 45,000 barrels daily, but during the war new installations increased the charging capacity to about 90,000 barrels daily. The refinery processes all but a small quantity of the crude oil produced by Iraq Petroleum Company, with the crude oil delivered at the Tripoli terminal shipped to Haifa by a fleet of tankers. Further additions likely will be made at this plant in the near future.

Kermanshah Petroleum Company (Anglo-Iranian) has a 20,000-barrel daily capacity plant at Kermanshah, Iran, and Alwand, Iraq. French interests operate a small plant at Tripoli. In addition to these plants, a crude oil topping plant is located in the Kirkuk field.

The Baghdad press recently announced that the Iraq government intends to build an oil refinery at Baiji, in northern Iraq. Capacity of this proposed project is put at 300,000 tons (2,244,300 barrels) anually, or enough to supply Iraq's requirements of refined oil. At present, the country's demand is partly met by the small plant near Alwand, with additional supplies coming from Abadan, Iran.

PIPE LINES

An expansion program of the pipe line system in Iraq is being conducted by Iraq Petroleum Company. At present, the system consists of a 12¾-inch line from Kirkuk to Haditha, the branching point, with legs to Tripoli and Haifa. The Kirkuk-Haifa line is 621 miles long and the Kirkuk-Tripoli carrier is 532 miles long. This system was completed in 1934 and has a daily capacity of 90,000 barrels.

The new expansion program consists of a 620-mile, 16-inch, line from Kirkuk to Haifa which will parallel the existing 12-inch line. Construction is underway. Plans have also been advanced to duplicate the Kirkuk-Tripoli 12-inch line with a 16-inch carrier. Completion of this expansion program would provide outlet for about 300,000 barrels of oil daily.

The present lines, all buried, require 12 pump stations. The Iraq company also operates loading terminals at Haifa and Tripoli.

Iraq's Annual Production Record
(In Barrels)

YEAR	Daily Average	Annual Output
1934	52,000	9,505,000
1935	75,000	27,197,000
1936	81,000	29,600,000
1937	86,000	31,396,300
1938	75,000	27,227,300
1939	93,000	33,761,300
1940	48,000	17,350,600
1941	29,000	10,657,500
1942	48,000	17,434,000
1943	67,000	24,445,600
1944	81,645	29,800,000
1945	90,140	32,900,000
Total Output		291,274,600

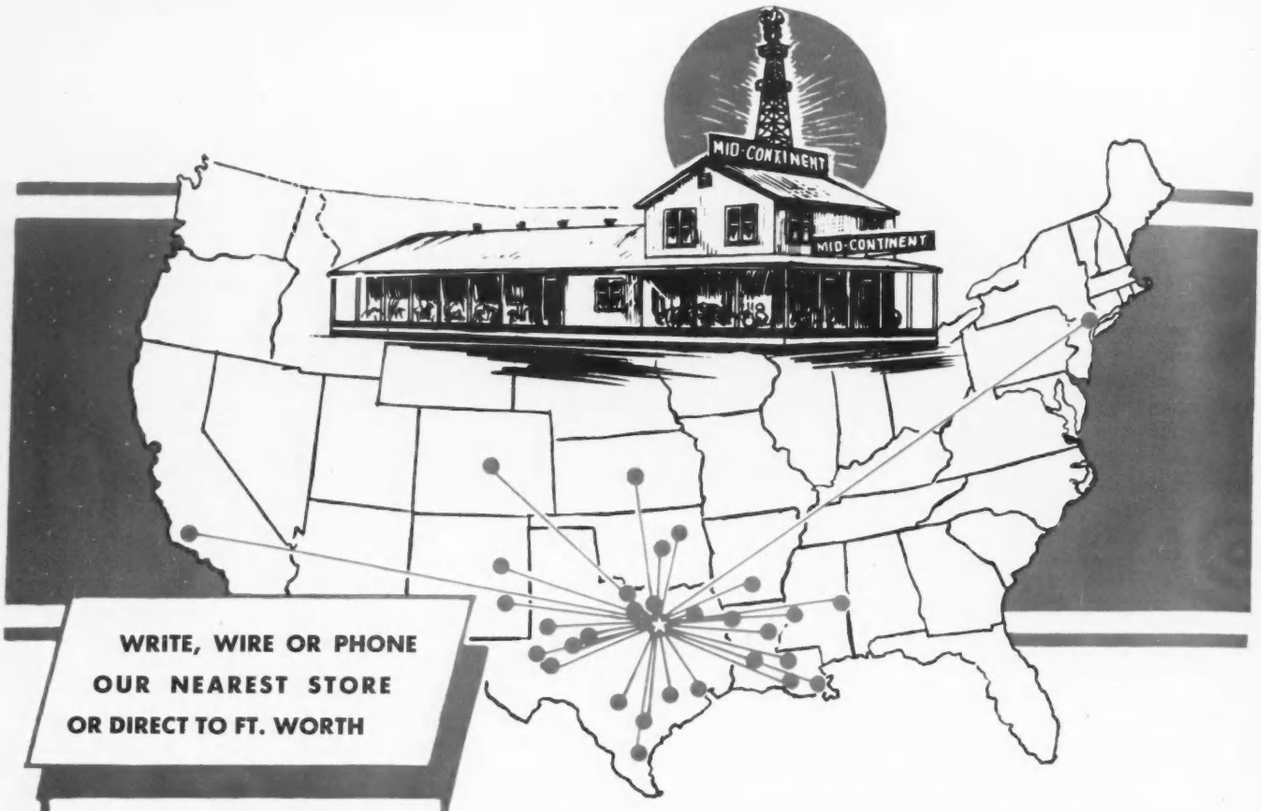
Oil Wells and Production in Iraq

FIELD	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels			
		Shut in	Producing: Flowing	Producing: Art. Lift	Producing: Total Producing	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
Kirkuk	1927	8	10	...	10*	90,000	29,800,000	32,900,000	291,274,600
Qaiyarah Area		69	...	...	69				
Qaiyarah	1927	39	...	...	39	Production limited to a few thousand barrels yearly for local consumption. Cumulative production approximately 200,000 barrels.			
Najmah	1933	20	...	...	20				
Jawan	1933	5	...	...	5				
Qasab	1935	5	...	...	5				
Ain Zalah	1940	12	...	...	12	...	...	...	...

* There have been a total of 56 wells drilled on the structure. Of these completions, 36 well oil producers, 17 were observation wells to observe gas-oil and water-oil levels, 2 were potential gas input wells, and one was a surplus refinery product input well.

Engineering and Geological Data on Iraq Oil Fields

FIELD	Location on Map Page 251	Probable Ultimate Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION: Name	Kind	Age	Depths of Wells (Ft.): Minimum to Top of Pay	Depths of Wells (Ft.): Maximum Total Depth of Wells	Average Thickness of Pay (Feet)	Type Structure
Kirkuk	G-6, 7	83,500	36	Qarah Chauq	Limestone	Eocene-Miocene	950	2980	1000	Closed Anticline
Qaiyarah Area	F-3	35,000	19	Qarah Chauq	Limestone	Miocene	700	1000	3000	Closed Anticline
Qaiyarah Area	F-3	12,000	19	Pilsener	Limestone	Upper Cretaceous	1500	1800	300	Closed Anticline
Ain Zalah	C-1, 2	3,600	31	Ain Zalah	Limestone	Cretaceous or Mio.	5100	6000	1000	Closed Anticline
Haft-Kanek	M-10	...	...	Asmari	Limestone	Miocene-Eocene	3000	...	200-300	Anticline



WRITE, WIRE OR PHONE
OUR NEAREST STORE
OR DIRECT TO FT. WORTH

DIVISION OFFICES

HOUSTON, TEXAS
MIDLAND, TEXAS
SHREVEPORT, LA.
TULSA, OKLA.

DISTRICT OFFICES

BATON ROUGE, LA.
DALLAS, TEXAS
ODESSA, TEXAS
SAN ANTONIO, TEXAS
NEW YORK CITY, NEW YORK
NEW ORLEANS, LA.
LOS ANGELES, CALIF.
DENVER, COLORADO
WICHITA FALLS, TEXAS
WICHITA, KANSAS

BRANCH STORES

Bowie, Texas
Edmond, Okla.
Eunice, New Mexico
Falfurrias, Texas
Fullerton, Texas
Gainesville, Texas
Hobbs, New Mexico
Houma, La.
Houston, Texas
Kermit, Texas
Kilgore, Texas
Laurel, Miss.
Lake Charles, La.
Magnolia, Ark.
Natches, Miss.
Odessa, Texas
Refugio, Texas
Raymondville, Texas
Shreveport, La.
Sundown, Texas
Wichita Falls, Texas
Wichita, Kansas
Waterproof, La.

Immediate Delivery...

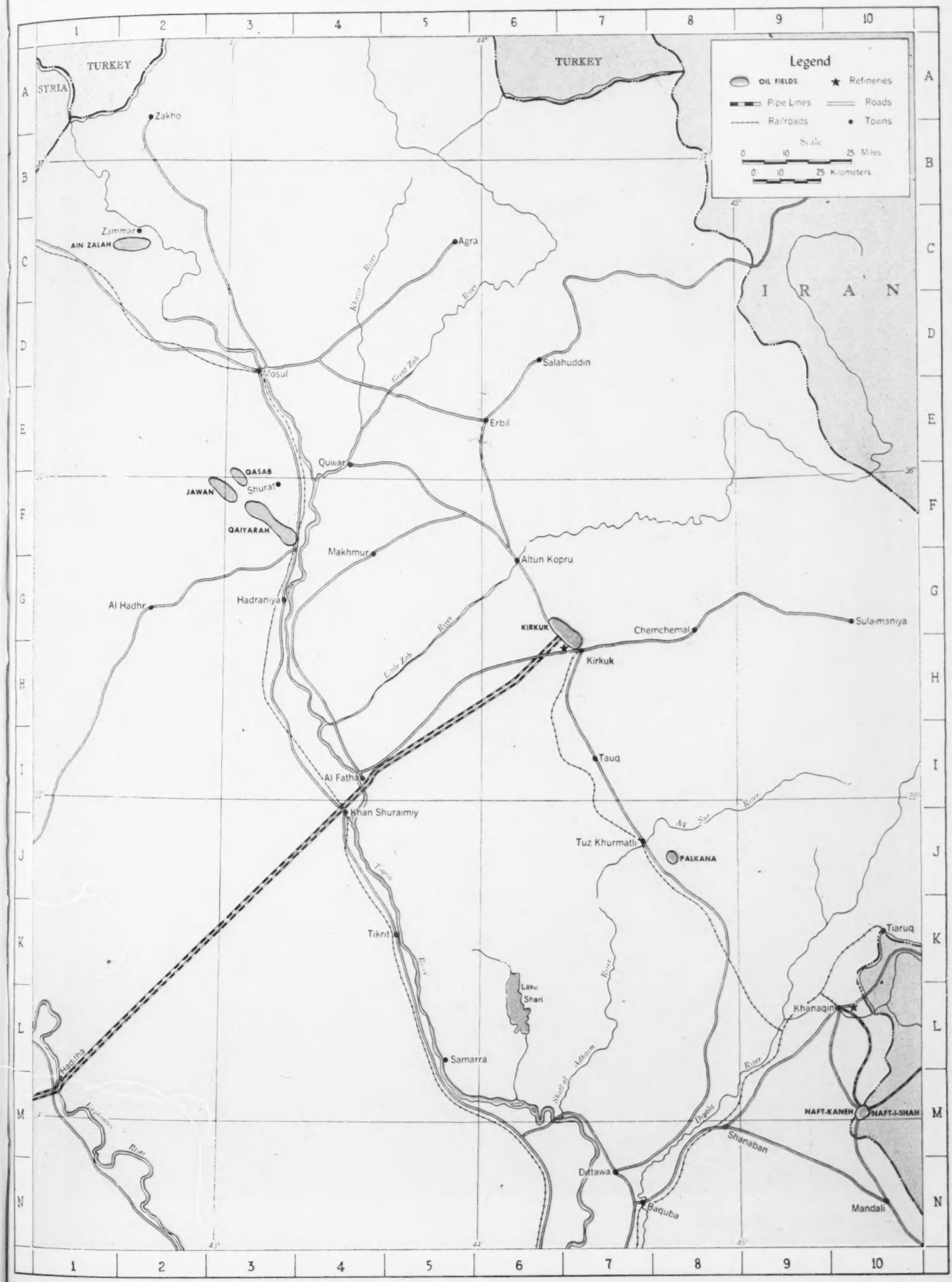
...Can be made...on Complete Drilling Rigs for all depths

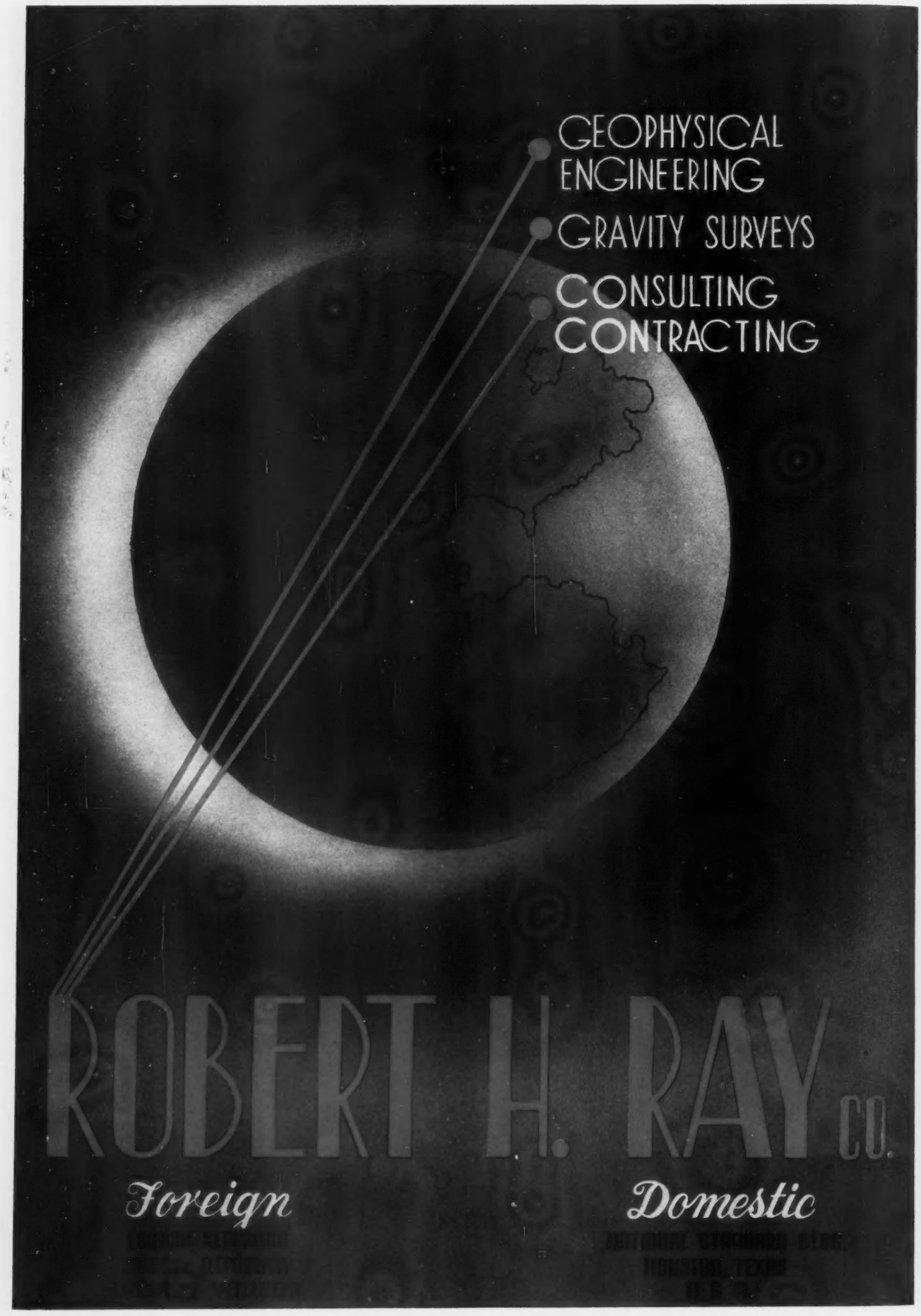
Large quantities of ALL classes of equipment in stock for immediate delivery . . . your needs can be promptly furnished . . . Don't assume it's not available.

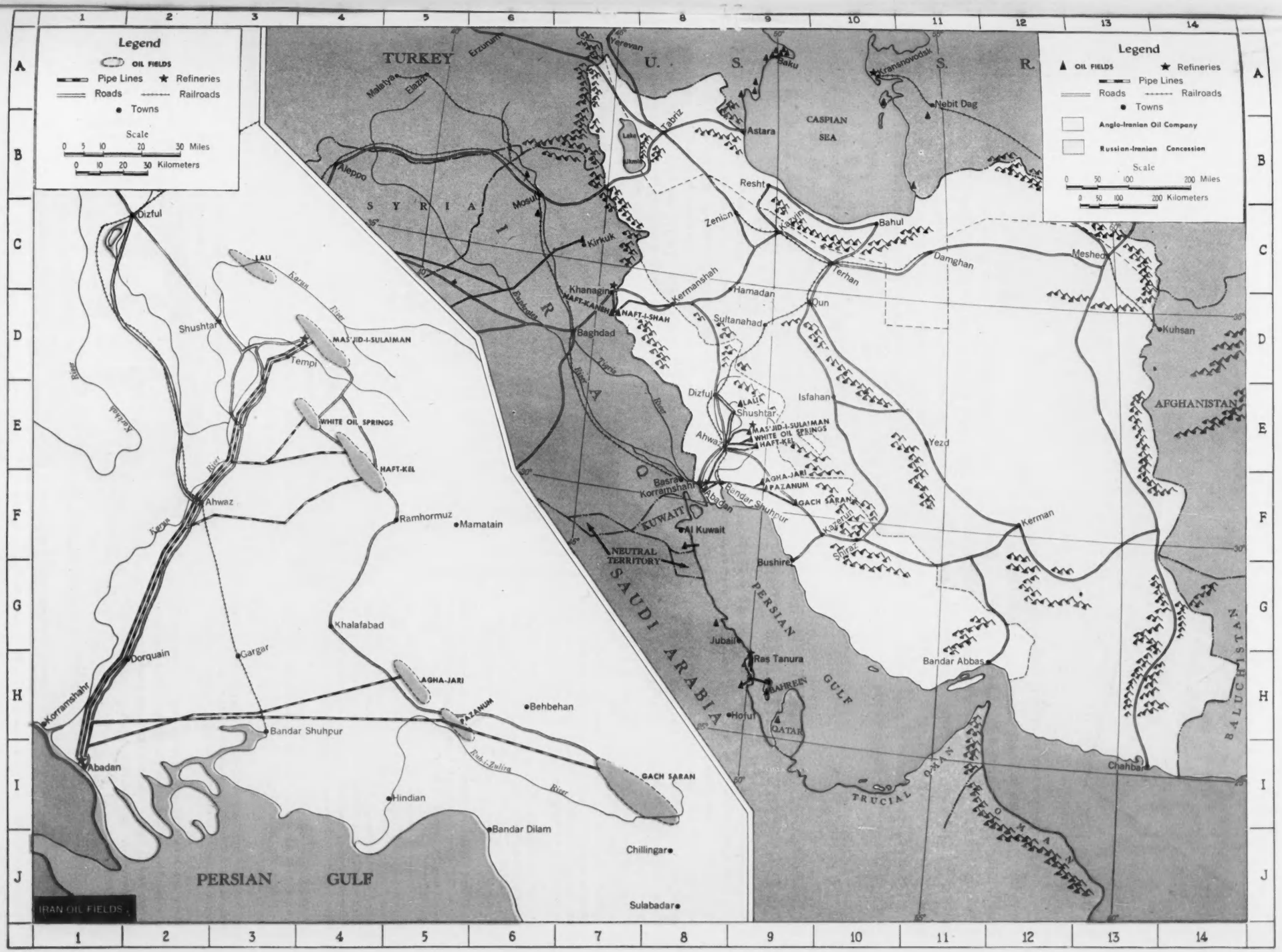
General Offices
MID-CONTINENT BLDG.
FORT WORTH, TEXAS

MID-CONTINENT SUPPLY COMPANY

IRAQ—OIL AREA




GEOPHYSICAL
ENGINEERING
GRAVITY SURVEYS
CONSULTING
CONTRACTING
ROBERT H. RAY CO.
Foreign
Domestic


Legend
OIL FIELDS
Pipe Lines
Refineries
Roads
Railroads
Towns
Scale
0 5 10 20 30 Miles
0 10 20 30 Kilometers
Legend
OIL FIELDS
Refineries
Pipe Lines
Roads
Railroads
Towns
Anglo-Iranian Oil Company
Russian-Iranian Concession
Scale
0 50 100 200 Miles
0 50 100 200 Kilometers
TURKEY
SYRIA
IRAQ
KUWAIT
NEUTRAL TERRITORY
SAUDI ARABIA
QATAR
TRUCIAL OMAN
PERSIAN GULF
U. S. S. R.
CASPIAN SEA
AFGHANISTAN
BALUCHISTAN
Erzurum
Malatya
Elazig
Aleppo
Mosul
Kirkuk
Baghdad
Khanagin
Tabriz
Lake Urmia
Astara
Baku
Yerevan
Krasnovodsk
Nebit Dag
Resht
Zenjan
Bahul
Damghan
Meshed
Terhan
Kermanshah
Hamadan
Qum
Sultanahad
Kuhsan
Isfahan
Yezd
Kerman
Dizful
Shushtar
Ahwaz
Basra
Korramshahr
Abadan
Bandar Shuhpur
Bushire
Bandar Abbas
Chahbar
Jubaile
Ras Tanura
Hofuf
Behbehan
Khalafabad
Dorquain
Gargar
Ramhormuz
Mamatain
Hindian
Bandar Dilam
Chillingar
Sulabadar
LALI
MASJID-I-SULAIMAN
Tempi
WHITE OIL SPRINGS
HAFT-KEL
NAFT-I-SHAH
NAFT-KANEH
AGHA-JARI
PAZANUM
GACH SARAN
Karun River
Karkheh River
Diz River
Tigris River
Euphrates
Rud-i-Zuhlra River
Kazerun
Shiraz
IRAN OIL FIELDS

NO MATTER WHERE YOU DRILL OR WHAT YOU DRILL WITH...

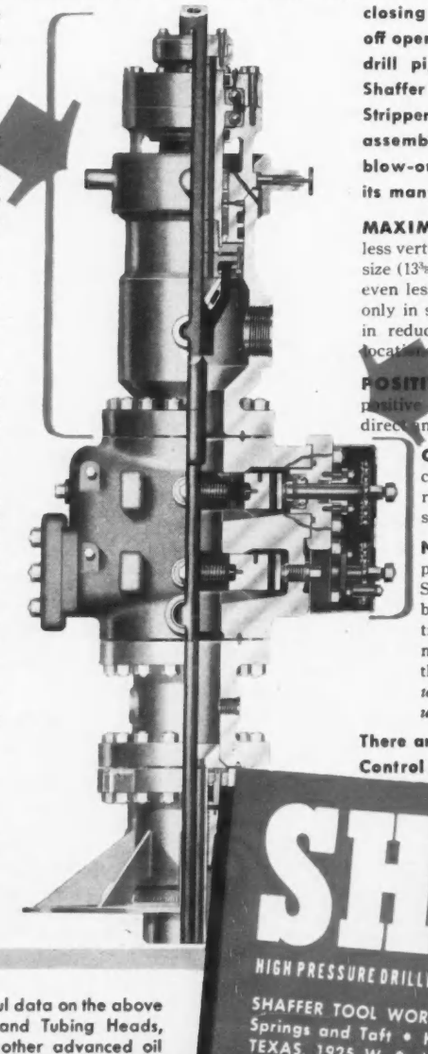
THIS SHAFFER PRESSURE CONTROL COMBINATION IS UNEQUALLED!

Whether you're drilling in the world's most remote locations—or in the highest-pressure fields—or are just drilling a "routine" well . . . here's a pressure control hook-up that meets *every* requirement for maximum simplicity, adaptability, efficiency, compactness and fool-proof dependability.

It gives a *continuous* pack-off on any and all portions of the drilling string—kelly, couplings, tool joints, subs, drill collars and drill pipe, whether upset, flush or coupled. For *any* rotary drilling operation, in *any* location, under *any* conditions, here is the most complete and advanced pressure control equipment yet developed. Check over the unique features engineered into this Shaffer assembly . . .

THE SHAFFER COMBINATION ROTATING BLOW-OUT PREVENTER AND STRIPPER

Compare with any other equipment the all-around protection and unequalled safety provided by this Shaffer unit. All the features needed for successful and simplified drilling under pressure are embodied in this one compact unit. What's more, no special drill string equipment is necessary, for it operates with the kelly and drill pipe normally used.



- It seals off around any and all elements in the drilling string – kelly, couplings, tool joints, subs, drill collars and drill pipe, whether upset, flush or coupled. As various diameters and shapes pass through the unit, the stripper rubber *automatically* expands and contracts to pass them *without losing its seal.* And the greater the well pressure, the tighter the seal!

- It maintains its seal *continuously* without having to apply mechanical or hydraulic pressure of any kind from the outside. And it enables the operator not only to *drill* under pressure, but also to *strip* drill pipe in and out of the well under pressure.

- When drilling, the Stripper assembly rotates freely *with the kelly* so that there is practically no wear on the rubber. This assures long life, minimum maintenance and positive seal at all times.

- When making connections, no special operations are necessary. Since all elements in the drill string strip through the unit, it is only necessary to raise the drill string through the Stripper, add or remove pipe, replace the kelly and lower the string in the usual manner for continued drilling. At all times the unit maintains complete seal against highest well pressures.

- The Stripper rubber cannot extrude or become damaged – either by high pressures or by pulling large diameters through it – because steel reinforcing latches prevent abnormal distortion of the rubber.

- Note how amazingly compact this unit is – a feature that reduces vertical height requirements to a minimum and permits its installation under even most difficult space limitations.

There are many more vital advantages incorporated into the Shaffer Combination Rotating Blow-out Preventer and Stripper – features that you should investigate before you purchase *any* pressure control equipment. Write for details!

THE SHAFFER DOUBLE CELLAR CONTROL GATE

The Shaffer Double Cellar Control Gate combines in one compact body two compartments, complete with ram assemblies—the upper for closing around the drill pipe and the lower for closing off open hole. The upper rams for closing off around the drill pipe give complete stand-by protection to the Shaffer Combination Rotating Blow-out Preventer and Stripper when emergencies arise, and the lower ram assembly for closing off open hole protects against blow-outs when the pipe is out of the well. A few of its many advancements include . . .

MAXIMUM COMPACTNESS: The Double Gate requires less vertical space than two single gates. Even in the largest size (13⅝") its overall height is *less than 29".* Smaller sizes are even less. Think what this unusual compactness means, not only in saving cellar space and installation expense, but also in reducing transportation and handling costs in overseas locations.

POSITIVE OPERATION: Rams are opened and closed by positive mechanical drive. Their operation is quick, simple, direct and fool-proof.

QUICK RAM CHANGES: Rams can be quickly changed to fit smaller or larger pipe sizes by simply removing *one* end cover. It's quick, convenient, labor-saving!

NO POWER LIMITATIONS: And here's a very important point – no matter what your power facilities, Shaffer Gates can be adapted to them. Shaffer Gates can be equipped to operate either by air, hydraulic, electric or steam power drives . . . or they can be operated manually, either alone or in combination with any of the above types of power. *This important feature means universal adaptability to any rig, regardless of the power used!*

There are many other features built into Shaffer Cellar Control Gates. Write direct for complete information.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, Calif. • California Service Shops: Santa Fe Springs and Taft • HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 W. 2nd St. • OKLAHOMA CITY, OKLA., Acme Oil Tool Co. 1001 S. E. 29th St. • EXPORT SALES OFFICE: Shaffer Tool Works, 30 Rockefeller Plaza, New York, N. Y., U. S. A.

See the Shaffer section of your Composite Catalog for helpful data on the above equipment as well as for information on Shaffer Casing and Tubing Heads, Shaffer Flow Beans, a complete line of Fishing Tools and other advanced oil tool equipment.

Write for your free copy of the complete Shaffer Catalog!

IRAN

OIL CONCESSIONS

THERE are two oil concession in Iran with the oldest license being held by Anglo-Iranian Oil Company, Ltd. This company has a 100,000 square mile (64 million acres) concession along the Iraq border and the Persian Gulf on which are located the present oil producing areas of Iran. The concession runs 60 years from December 31, 1933. The Anglo-Iranian company is owned 55.9 percent by the British government, 26.3 percent by Burma Oil (Shell), and 17.8 percent by individuals.

Most recent concession was that granted Russia by the Iranian government. The pact which ended a dispute between these two nations in the Security Council of the United Nations includes the following points:

1. Russo-Iranian Oil Company is to be created, with Iran holding 49 percent and Russia 51 percent of the stock for the first 25 years of a 50-year lease. For the second 25 years, the two countries will share 50-50 in the company's control.

2. The area of the concession (see map page 255) is a strip across the northern part of Iran near the Caspian Sea.

3. Russia will advance the capital for the company's operation while Iran's contribution will be the land.

4. Iran retains the right after 50 years to buy out the Soviet interest or to continue the company.

IRANIAN OIL FIELDS

Iran, currently the largest oil producing area in the Middle East, has seven producing fields—six oil fields and one gas field. The estimated proven reserve of this country is 6 billion barrels. There are about 55 producing wells in the fields with a total daily production of 385,000 barrels. In 1938 the country produced 215,000 barrels daily. Iranian fields include Masjid-i-Sulaiman, Gach-Saran, White Oil Springs, Agha-Jari, Haft Kel, Pazanun (gas), and Naft-i-Shah (known as Naft Kaneh in Iraq).

Masjid-i-Sulaiman—This field, a large elliptical anticline, was discovered in May, 1908, and covers a proven area of some 36,000 acres. Until the end of 1943 about 280 wells had been drilled of which 258 reached the main producing horizon. All but 95 of these wells were abandoned. Of the 95 wells, 21 produce oil, 19 are shutin oil wells, 13 are gas wells, 6 are pressure observation wells, 9 are oil-water contact observation wells, 9 are gas-oil contact observation wells, and 28 are inactive. Of the 21 oil producers, only 3 are on artificial lift. The Asmari lime of the Miocene-Eocene age is the principal oil producing zone. Top of the pay ranges from 900 feet on the crest of the structure to 3500 feet on the flanks. The average thickness of the pay is about 100 feet. At the end of 1943 the field had produced 810,923,596 barrels of oil, of which 107,696,813 barrels of fuel oil had been returned to the reservoir, giving a net production of 703,226,783 barrels. Daily average production in 1943 was 78,215 barrels of which 51,259 barrels were returned to the formation. The gravity of the oil is about 37 degrees (API).

Gach-Saran—This field was discovered in 1926 and the structure, an anticline, is 18 miles long and about 2½ miles wide. At the end of 1943 13 wells had been drilled including 4 dry holes. Two wells were producing oil and one was a gasser. Daily average production in 1943 was 20,500 barrels while cumulative production at the end of 1943 was about 20 million barrels. Production is from the Asmari lime in the Miocene-Eocene age. The pay averages 1000 feet thick.

White Oil Springs—This field was opened in 1934 and at the end of 1943 had 2 gas wells producing from the Asmari lime in the Miocene-Eocene age from about 4000 feet.

Agha-Jari—Discovered in 1937, this field had 3 oil wells and one gas well at the end of 1943. However, the number of wells has increased considerably since that time. The anticline is about 20 miles long and 4 miles wide. Production is from the Asmari lime which is topped at about 8000 feet.

Haft-Kel—This is one of the largest producing areas in Iran, having been discovered in 1925. At the end of 1943, a total of 40 wells had been drilled, of which 13 were producing oil. Daily average production at the end of 1943 was 190,000 barrels. Cumulative production at the end of 1942 was 425 million barrels, of which 12 million barrels had been returned to the formation in the form of refinery products. The anticline structure is 18 miles long and 2½ miles wide.

Pazanun—This gas field was discovered in 1937 and produces from the Asmari lime from about 7500 feet. Four wells had been drilled to the end of 1943 with condensate production opened in 1943.

Naft-i-Shah—This field is located on the border of Iraq and Iran. The Iraq portion of the field is called Naft-Kaneh. Daily average production is about 10,000 barrels. Production is from the Asmari with average pay thickness of 300 feet.

REFINERY

The refinery of Anglo-Iranian Oil Company, Ltd., located at Abadan, Iran, is one of the industry's largest complete refining units. Since its construction more than one billion barrels of crude oil has run through its stills and present daily throughput is about 385,000 barrels. A network of pipe lines brings the oil to the Abadan refinery from Iranian fields as well as returning the unmarketable products to the fields to be returned to the formation. This large refinery includes units for crude oil distillation, cracking and reforming, superfractionation, special products, power plant and steam generation, packaging and loading.

Also located in the Iranian fields are topping plants which process the oil before piping it to the Abadan plant.

Engineering and Geological Data on Iran's Oil Fields

FIELD	Location on Map Page 255	Proved Area (Acres)	Gravity of Oil (API)	PRODUCING FORMATION						
				Name	Kind	Age	Depths of Wells (Ft.) Minimum Top Pay	Depths of Wells (Ft.) Maximum Total Depth	Average Thickness of Pay (Feet)	Type Structure
Agha-Jari	F-9	30,000	36.0	Asmari	Lime	Miocene-Eocene	8000		1000	Anticline
Gach-Saran	F-9	28,800	42.0	Asmari	Lime	Miocene-Eocene	2700 5700	7500	1000 to 1100	Asymmetric anticline
Haft Kel	E-9	28,000	38.0	Asmari	Lime	Miocene-Eocene	3100	4350	1000	Anticline
Masjid-i-Sulaiman	E-9	36,000	37.0	Asmari	Lime	Miocene-Eocene	900	3500	1000	Anticline
Pazanun (Gas)	F-9	.....	.....	Asmari	Lime	Miocene-Eocene	....	7500	175	Anticline
White Oil Springs	E-9	.....	35.4	Asmari	Lime	Miocene-Eocene	.....	4000	.....	Anticline
Naft-i-Shah	D-7	.....	.....	Asmari	Lime	Miocene-Eocene	3000	....	200 to 300	Anticline

Good ANSWERS TO A LOT OF PROBLEMS!

HOMCO supplies the answers . . . to most problems in drilling today's wells.

Twisted off? Homco Overshots, Spears and Taps, working, when necessary, in conjunction with the Homco Knuckle Joint, will usually get the fish.

Stuck? Homco's Inside and Outside Cutters, with the fishing tools, will ordinarily take care of that situation.

Pass a sand? Run the Homco Sidewall Coring Tool for the core you missed.

Heaving, dangerous formations? The Homco Safety Joint run above the bit or emergency tools will lessen the danger from further complications.

Mixed strings of pipe? Homco Subs and Bushings, in their various A.P.I. thread sizes and types, will make any connection common to the oil field. Special connections upon order.

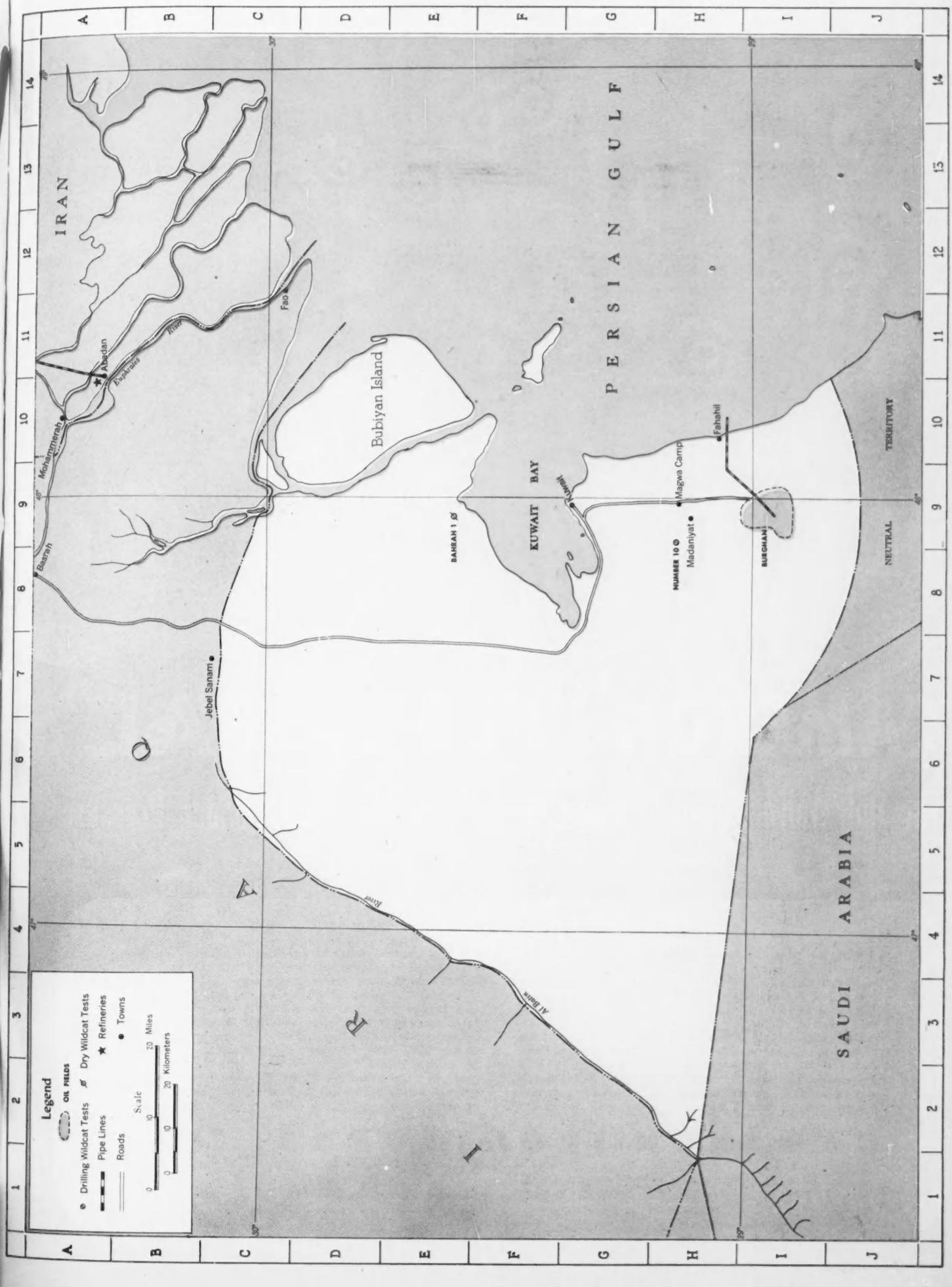
You'll usually find your answer with **HOMCO**

Export Representative:
E. F. Gahan, 500 Fifth Avenue, New York, N. Y.

HOMCO
HOUSTON OIL FIELD MATERIAL COMPANY, Inc.
HOUSTON, TEXAS

OIL INDUSTRY'S MOST *Complete* SERVI

KUWAIT


IRAN
PERSIAN GULF
Bubiyan Island
KUWAIT BAY
BAHRAH I Ø
NUMBER 10 ⊙
Madaniyat
Magwa Camp
Fahahil
BURGHAN
NEUTRAL TERRITORY
SAUDI ARABIA
IRAQ
Abadan
Euphrates River
Mohammerah
Basrah
Fao
Jebel Sanam
Kuwait
Shatt al Arab River
Al Batin
Legend
OIL FIELDS
Drilling Wildcat Tests
Dry Wildcat Tests
Pipe Lines
Refineries
Roads
Towns
Scale
0 10 20 Miles
0 10 20 Kilometers

CAMERON "FLEX-SEAL"

The Only Valve Designed Expressly for Abrasive Fluids Under Pressure

With the advent of deep drilling and higher circulating pressures, the destructive action of abrasive drilling fluid moving at high velocity posed a problem for rig owners. Upon completing a single deep well it was often necessary to replace or make costly repairs on most of the valves in the mud manifold.

Cameron engineers, with a rich background of experience in resilient, abrasion-resistant seals for blowout preventers and master valves, set out to design a valve expressly for mud line service. Logically, they replaced the conventional metal-to-metal seal . . . source of most mud line trouble . . . with a renewable resilient flow-way insert, or gate packer, to absorb the cutting action of sand-laden fluid and to provide a pressure-tight seat for the gate.

Thus, the first and only mud line valve . . . the Cameron "Flex-Seal" . . . solved the rig owner's mud line valve problem. Cost records reveal that they are saving up to 98% maintenance over conventional valves and stop cocks.

Cameron "Flex-Seal" Mud Line Valves are made in three models: 2000, 4000 and 6000 lbs. test pressure, all employing the unique renewable resilient flow-way insert, and in a full range of sizes. Complete details are carried in your Composite Catalog, or descriptive literature will gladly be sent on request.

CAMERON IRON WORKS, INC.

HOUSTON, TEXAS

Export: 74 Trinity Place, New York City. *California:* Howard Supply Company, Los Angeles. *Oklahoma:* 310 Thompson Bldg., Tulsa.

KUWAIT

CURRENT ACTIVITIES

FACILITIES are being completed this month (May) for initiating producing operations in the seven-year-old Burghan field of Kuwait. This field, regarded as one of the world's largest known oil reserves, is in the southeastern part of the principality of Kuwait, at the head of the Persian Gulf in the heart of the Middle East.

In addition to reconditioning the wells, which were plugged during the war, and installing separators and other field equipment, the project has included the laying of pipe lines, construction of terminal storage tanks near the coast, and an offshore tanker loading berth.

A 10-inch pipe line has been laid from the field to the site of a storage terminal, on a hilltop overlooking the coastal village of Fahahil. Four tanks of 139,200 barrels capacity each, comprise the terminal depot. From that point to the shore, a distance of about 23,000 feet, a 22-inch line has been installed, to feed two 12¾-inch submarine lines out to the loading berth in the Persian Gulf. The storage tanks and the submarine lines have recently been completed.

While it is probable that the Burghan field at its present stage of development could produce more than 75,000 barrels daily, the production will be kept in line with the capacity of the 10-inch line to the storage terminal which is estimated at a minimum of 30,000 barrels daily.

The crude will be loaded by gravity flow from the storage tanks to tanker vessels by virtue of an elevation differential of 360 feet between the two points. Production will be transferred from the field gathering stations to the gravity loading storage tank terminal by pumps.

Reconditioning of the Burghan wells involve the drilling out of concrete plugs, since all but one of the holes were sealed in that manner by request of Allied authorities at the time German armies were threatening to overrun the Middle East.

Two portable rigs are being used at Burghan to reopen plugged holes. Eight of the wells have blank casings to bottom and will be perforated when cleaned out. When the wells were originally brought in they were given initial production tests through open hole, but with choke valves installed.

KUWAIT CONCESSIONS

Kuwait consists of 6000 square miles with the entire country being desert area. A concession covering all the country was granted to Kuwait Oil Company, Ltd., on December 23, 1934, and runs for 75 years. The company is owned 50 percent each by Gulf Exploration Company (Gulf Oil Corporation) and Anglo-Iranian Oil Company.

HISTORY OF DEVELOPMENT

Geological and geophysical work were conducted during 1935-36 and the first test was drilled at Bahrah, north of Kuwait Bay, which was dry and abandoned around 8000 feet. The second test was drilled 30 miles south of Kuwait and was completed as a flowing well in early 1938, at 3692 feet to open the Burghan pool. This well was completed in the Upper Cretaceous formation and flowed 32.5-gravity oil. Open hole production tests of this well, through one-inch choke, yielded clean oil at the rate of 9000 barrels daily.

Well No. 2 was drilled to 4157 feet, through two pays, and tested with open hole and one-inch choke, flowed at the rate of 10,000 barrels daily. Drilling development continued until 1942 and at that time nine wells had been completed at Burghan with no dry holes in an area which covers approximately 18,000 proven acres.

The field is only partly developed within the area of closure indicated by geophysical mapping, and therefore probably can be extended in all directions when world conditions warrant. The outlook for extension to the north is regarded as especially favorable, along the line of the anticlinal trend on which the Burghan is situated. Elongation of the Burghan dome in a northerly direction is clearly indicated by geophysical interpretation.

Approximately ten miles north of the Burghan field, the company began drilling operations in July, 1942, at a wildcat location on another closed structure along the same trend. Drilling was suspended soon after, because of the war, and the equipment moved to Iran for use in Anglo-Iranian operations.

GEOLOGY

There are four pays in the producing section at Burghan, occurring as sandstone members in a thick Lower Cretaceous shale formation. No local name has been given to this formation, but it is probably approximately equivalent in age to the producing section at Bahrein Island. It is likely that it can also be correlated with the Rutbah sand of Iraq.

More detailed studies may reveal that the Burghan sandstone pays can be more exactly correlated with the Upper Bahrein silty sands, which are likewise petroliferous but too tight at Bahrein to be considered commercially important. The underlying Lower Bahrein Limestone is the drilling objective in the latter locality.

An oil-water contact is encountered at Burghan at approximately 4500 feet, in the fourth pay sand. Seven of the wells were drilled to the water and plugged back for completion. Oil in the field averages 33-gravity.

KUWAIT RESERVES

Kuwait was visited in the fall of 1944 by the Technical Oil Mission to the Middle East sponsored by former Petroleum Administrator Harold Ickes and headed by Dr. E. DeGolyer. On a basis of the well information and extensive geological-geophysical studies that were available, DeGolyer estimated the country's proved and indicated reserves to be 9 billion barrels, with 4 billion actually proved.

TRANSPORTATION

A weekly airplane service to Kuwait Oil Company's operations from Abadan, Iran, is furnished by Anglo-Iranian Oil Company. Water transportation facilities are also provided while a 50-mile desert highway connects the company's headquarters with Basra in southern Iraq.

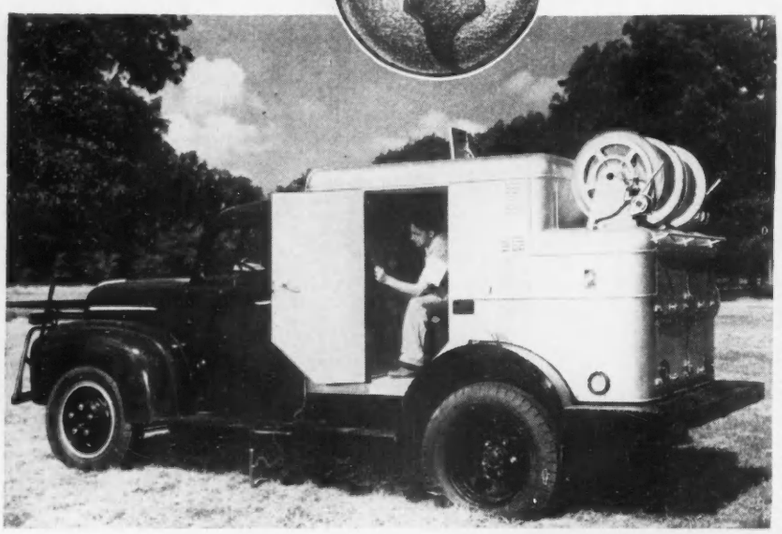
The shortage of water is a major transportation problem. Water for domestic use is brought in at present in native sloops. Efforts have been made to obtain water from deep wells and tests have been drilled to almost 1000 feet.

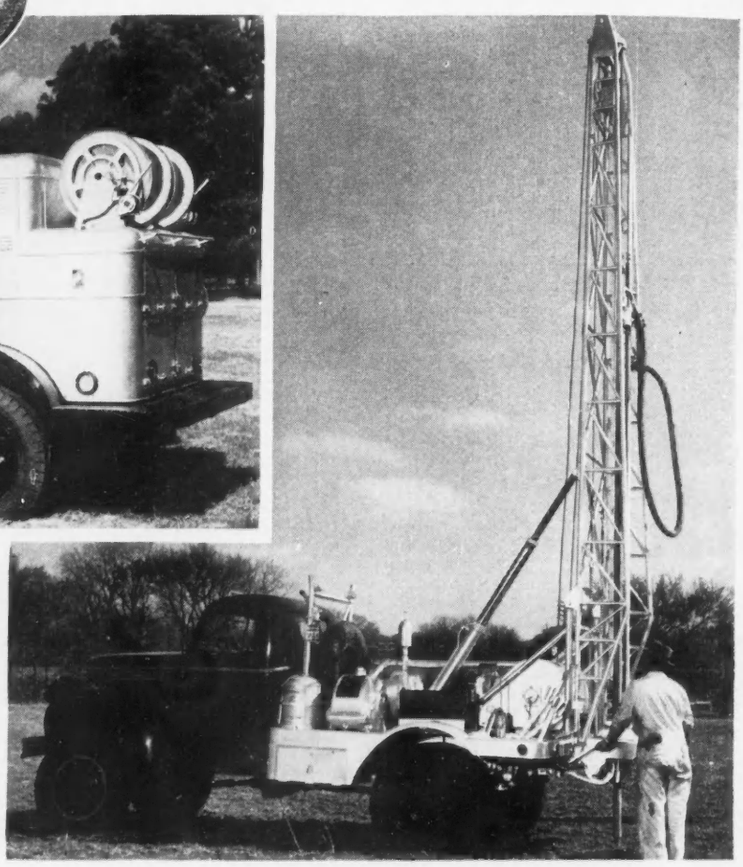
LIVING QUARTERS

Present plans of the Kuwait company call for the construction of permanent homes for married employes, bachelor quarters, clubs, utilities and all the associated activities connected with oil operations in the Middle East. Because of the high range of temperature in the summer, actual housing facilities are particularly important. The present field camp is located at Magwa and is to be moved and enlarged. Company headquarters are located at Kuwait.

E.L.I. offers COMPLETE EQUIPMENT

FOR WORLD-WIDE SEISMIC EXPLORATION





The ELI Seismograph is the most advanced unit in the field. It includes every proven feature for obtaining accurate and dependable records. Automatic Amplitude Control, for example, assures balanced records from all shot sizes. Clean, delux installation of instruments, cab arrangement, power reels, communication system, etc., are designed for maximum efficiency and ease of operation. We will be glad to demonstrate the superiority of ELI equipment.

The new ELI M-6 Drill is the most versatile truck mounted drilling unit in operation today. Combining ease of operation, simplicity and proven ability to easily drill to 1,000', establishes its place at the head of the list of portable rigs. For shot-hole, water wells and core drilling, inspect the features of the new M-6.

DRILLING SUPPLIES

PUMPS
KELLYS
SWIVELS
DRILL BITS
DRILL PIPE
PRESSURE HOSE
HOISTING PLUGS

PORTABLE REFLECTION or REFRACTION SEISMOGRAPH UNITS • WATER TRUCKS • SHOOTING TRUCKS SUBSURFACE RECORDING INSTRUMENTS and RELATED LABORATORY EQUIPMENT • PENETRON

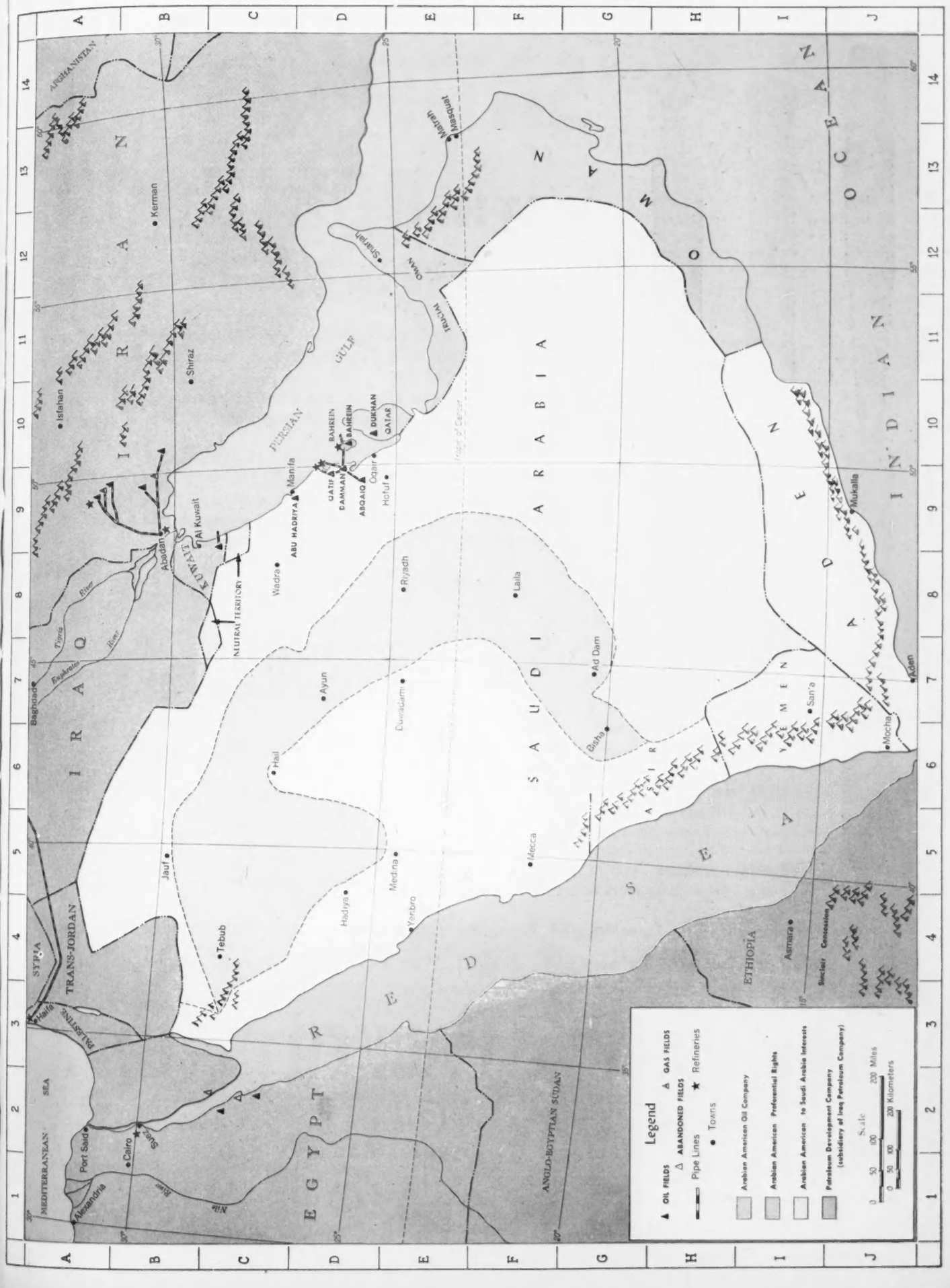
Engineering Laboratories, Inc.

PLANTS AT TULSA AND DALLAS

Main Office: 602-624 East Fourth Street, Tulsa 3, Oklahoma, U. S. A.

SAUDI ARABIA—BAHREIN—QATAR

Concessions



SIMPLICITY *means* SATISFACTION WITH ROBINSON

PACKERS and Allied Products

Yes, SIMPLICITY OF CONSTRUCTION is greatly responsible for the high degree of satisfaction which experienced oil operators have always found with dependable ROBINSON products. The *positive action* of these high quality packers and other allied products, backed by years of research and development, mean profitable performance for you, regardless of operating requirements.

The Robinson BULL PLUG and SWAGED NIPPLE, pictured below (left to right), are protected by CADMIUM—judged 20% more corrosion-resistant than other metals—and are precision-manufactured of only the highest grade materials. With seamless construction, their quality and uniformity is guaranteed by rigid inspections. Both are available in all weights and sizes.

Three of Robinson's outstanding packer values are, left to right, HIGH PRESSURE THREE-IN-ONE, widely used for shutting in gas wells with extreme pressures. Center, the LIMIT PLUG, built with ample water courses to withstand high pressures, and to accommodate large expansions. Right, the HOOK WALL PACKER—Robinson's answer to the problem of creating flows in new wells, and for packing off water in leaky casings.

Robinson products—high in quality—merit your consideration. Investigate them today.

Write for Our Catalog and Complete Information on Our Full Line of
Oil and Gas Well Packers • Plugs • Shoes • Swaged Nipples

ROBINSON PACKER CO.

P. O. Box 1408 **TULSA, OKLAHOMA** Phone: 3-8191

Factory: Coffeyville, Kansas

SAUDI ARABIA, BAHREIN, QATAR

PRODUCTION TREND

ANNUAL crude oil production in the Bahrein-Saudi Arabia fields has shown a sharp increase during the past three years and with world affairs remaining settled this trend will continue.

The production increased from 11,439,793 barrels in 1943 to 14,513,795 barrels in 1944. During 1945, pipe line and refinery facilities were expanded to a degree that production was boosted to 28,619,934 barrels, almost double that in 1944. Production in 1946 will be considerably greater than in 1945.

At the end of 1945, the daily average production was more than 100,000 barrels, with Saudi Arabia fields producing approximately 83,000 barrels as compared with 40,000 barrels daily at the close of 1944. On Bahrein Island, production has been steadily at 20,000 barrels daily.

Construction of the proposed 1000-mile, "big-inch" line from Arabia to a port on the Mediterranean would provide for an additional daily production of between 250,000 and 350,000 barrels.

Production on Qatar Peninsula also is being revived now that hostilities are ended.

OIL CONCESSIONS

Bahrein Petroleum Company, owned 50 percent each by Standard Oil Company of California and The Texas Company, holds concession on all of Bahrein Island. The concession runs for 55 years from June 19, 1940.

Petroleum Development, Ltd., subsidiary of Iraq Petroleum Company, Ltd., holds concessions consisting of 3000 acres in the independent states of Qatar, Trucial Oman, Oman, and Dhufar, in Saudi Arabia Peninsula.

Arabian American Oil Company, jointly owned by Standard Oil Company of California and The Texas Company, holds concessions totaling 253,125 square miles or 162,104,000 acres in Saudi Arabia. There are two concessions with one running 60 years from July 14, 1933, and the other, defined as preferential, 60 years from July 14, 1939.

SAUDI ARABIA FIELDS

The first oil discovery on the Arabian American Oil Company's concession in Saudi Arabia was the Damman field. The No. 1 well was completed in January, 1937, in the shallow Bahrein zone at about 2100 feet. Three thin, erratic lime zones were found down to 2300 feet. Several wells were drilled to this pay but the production did not indicate commercial development. The Arab zone, the main producing formation between 4300 and 4800 feet, was found in March, 1938. This zone is composed of four separate porous lime sections, which have an average aggregate thickness of about 190 feet and covers an area of about 9000 acres. The deepest test, No. 20 well, picked up high pressure at about 8625 feet. As of January 1, 1946, the Damman field had produced more than 50 million barrels of 35 to 50-gravity crude with oil reserves now estimated at more than 600 million barrels.

The second discovery in Saudi Arabia was the Abu Hadriya field, located 100 miles northwest of Damman and 10 miles from the Persian Gulf coast. The field was opened in March, 1940, producing from the Hadriya or Arab lime at 10,115 feet. Total depth of the discovery well was 11,220 feet, the deepest in Arabia. A second test was started but was shut down on January 1, 1946. This field is estimated to cover a probable area of 6500 acres with the reserves estimated at 140 million barrels.

The Abqaiq field, 50 miles southwest of Damman, and considered the largest pool in Arabia, was discovered in February, 1941. The Abqaiq 1 was completed in the D zone of the Arab formation at 6200 feet. The A and B zones in the Arab are wet with the C zone producing 24-28 gravity crude, while the D zone produces 34-38 gravity oil. The C zone has an average thickness of about 30 feet as compared to a 180-foot thickness in the D zone.

DRILLING IN 1945

Drilling in Saudi Arabia during 1945 resulted in the discovery of the Qatif field, located about midway between Damman and the Ras Tanura refinery. The Qatif 1 was completed at 7510 feet, in the Arab zone, for approximately 400 barrels of 37.5-gravity oil daily. More optimistic estimates place the probable proved area as 64,000 acres.

Also completed during 1945 was the No. 6 well at Abqaiq. This well, the highest well in the field, was completed in February, 1945, at 6175 feet, but because of lack of storage, was shut in without final testing. Flow tests through formation testers indicate this will be a very large producer.

Outside of these exploratory holes, only two wells were completed in the Damman field during 1945. Most of the year was devoted to reconditioning those wells cemented or completed originally with blank liners because of war conditions.

SAUDI ARABIA GEOLOGY

There are two geological provinces in Saudi Arabia. Old crystalline rocks classified as pre-Cambian are noted in the western portion. The eastern areas have sedimentary rocks which overlie the crystalline rocks. The sedimentary sequence includes early paleozoic rocks, and exceptionally complete representation of the Mesozoic. Tertiary and later deposits are to the east.

The eastern part of the Nejd area, west of Hasa Province,

Engineering and Geological Data on Saudi Arabia, Bahrein, Qatar Fields

FIELD, COUNTRY	Location on Map Page 267	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION			Depths of Wells (Feet)		Average Thickness of Pay (Feet)	Type Structure
				Name	Kind	Age	Minimum Top Pay	Maximum Total Depth		
Saudi Arabia:										
Abu Hadriya	D-3	6500	38	Arab	Lime	Cretaceous	....	10,100	....	Dome
Abqaig	H-4, 5	11,000	24 to 38	Arab	Lime	Cretaceous	....	6200	200	Anticline
Damman	G-6	9000	35 to 50	Bahrein Arab	Lime	Cretaceous	2100	4800	30–180	Salt Dome
Qatif	F-5	....	36	Arab	Lime	Cretaceous	....	....	....	....
Bahrein Island:										
Bahrein	H-7	10,000	33.5	Arab	Lime	Cretaceous	2000–4000	2250–4600	....	Elongated Dome
Qatar:										
Dukhan	J-7	40,000	36	Kerkrit	Lime	Jurassic or Cretaceous	5785	6015	50	Anticline

OF THE WORLD THAT TURNS ON OIL

Old stuff to America and Europe, full-fledged industrialization, recorded by history as The Industrial Revolution, is still the mere bud of opportunity to by far the greater part of the world. The blossoming of Asia, The Near East and South America promises fruit that Dresser Industries has long cultivated.

For the industrial world turns on oil. Oil lubricates the wheels. Oil, with gas, its sister under the earth's skin, fires the cylinders. And many a Dresser member company is well established in this fertile world market. The overwhelming majority of hot oil pumps in the refineries of Iraq and Iran, for example, were made by Pacific Pumps. Gas for the reborn French and Russian industries will be pumped by Clark compressors. Roots-Connersville blowers are used in large numbers by fourteen Latin American countries in as varied industries as rice irrigation and oil refining, tunnel ventilation and gas manufacturing. Ideco equipment is found in Turkey, Alaska, Russia, Arabia, Indonesia, North Africa, South America—and, in practically every active oil field in the world, may be found, also, Security rock bits and reamers.

Conditions in these wide-apart markets vary as much as the people—not just in business routine but in the physical requirements of each job. Dresser succeeded because Dresser engineering is custom-tailored. It is *problem-solving* rather than *product-specifying*. This ability to deal creatively with jobs all over the world is the type of thinking which makes any member of the Dresser family better able to satisfy your particular needs.

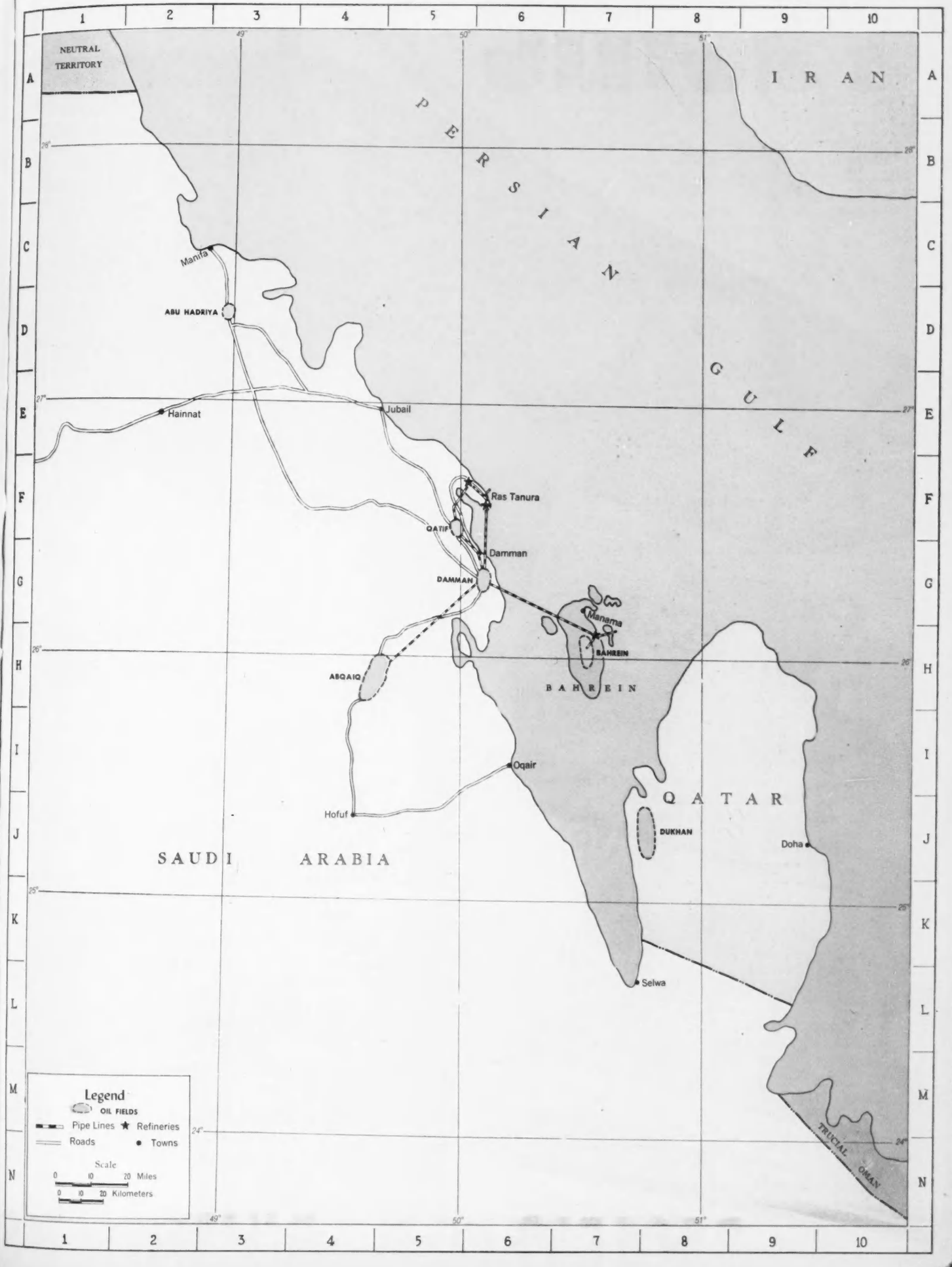
BOVAIRD & SEYFANG Manufacturing Co., Bradford, Pa.
BRYANT Heater Company, Cleveland, Ohio
CLARK Bros. Co., Olean, New York
DAY & NIGHT Mfg. Co., Monrovia, Calif.
DRESSER Manufacturing Div., Bradford, Pa.
DRESSER Manufacturing Company, Limited, Toronto, Ont., Canada
INTERNATIONAL Derrick & Equipment Co., Columbus, Marietta & Delaware, Ohio; Beaumont, Texas; Torrance, Calif.
KOBE, Inc., Huntington Park, Calif.
PACIFIC Pumps, Inc., Huntington Park, Calif.
PAYNE Furnace Co., Beverly Hills, Calif.
ROOTS-CONNERSVILLE Blower Corporation, Connersville, Ind.
SECURITY Engineering Co., Inc., Whittier, Calif.
STACEY BROS. Gas Construction Company, Cincinnati, Ohio
VAN DER HORST Corp. of America, Olean, N. Y. and Cleveland, O.

Creative Engineering IN WORLD MARKETS

DRESSER INDUSTRIES, INC.

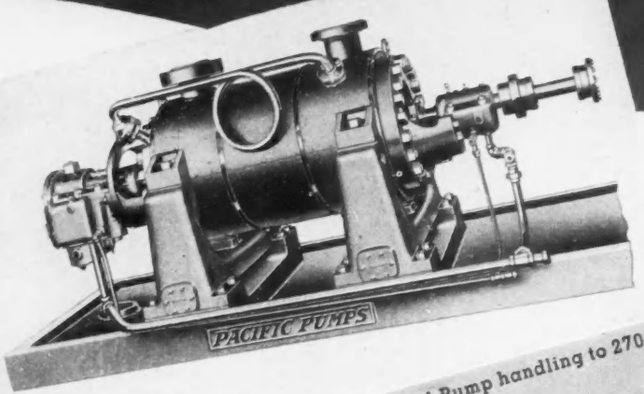
TERMINAL TOWER · CLEVELAND 13, OHIO
GEARED TO ANTICIPATE THE COURSE OF INDUSTRY
OIL AND GAS EQUIPMENT A SPECIALTY

SAUDI ARABIA—BAHREIN—QATAR

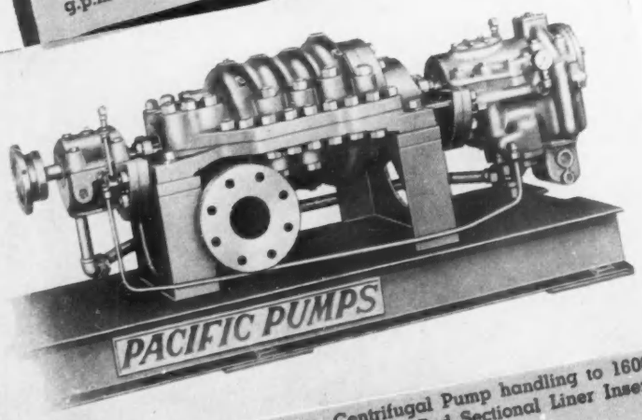


Pacific

designs and builds the correct types of pumps for all fluid handling needs of the petroleum industry



PACIFIC TYPE I Multi-stage Centrifugal Pump handling to 2700 g.p.m's. at 800 degrees F.



PACIFIC TYPE J B Multi-stage Centrifugal Pump handling to 1600 g.p.m's. at 500 degrees F. (Right) Pacific Rod Sectional Liner Insert Deep Oil Well Pump.

35

Pacific Deep Oilwell Plunger Pumps are "Precision Engineered," to meet the most exacting problems encountered in all types of fields and at all pumping depths.

An outstanding feature in these pumps is "Moloy," a special Molybdenum Alloy developed by Pacific Engineers, for the manufacture of Pacific Liners and Plungers.

A foremost fact about Pacific Deep Well Oilwell Plunger Pumps is that liners and plungers may be reground three and four times. Pacific's regrinding service enables the operator to go to his "scrap pile" for increased profits.

In the Centrifugal Pumping Field, Pacific's complete line of Centrifugal Pumps are made in styles and sizes to meet practically every need for this type of pump in refining, power and general industrial plants.

PACIFIC PUMPS INC., Huntington Park, Calif.
One of the Dresser Industries
Export Office: Channin Bldg., 122 E. 42nd St., N. Y.

MID-CONTINENT DIVISION
915 E. 2nd Street, Tulsa, Okla.

PACIFIC *Engineered* PUMPS

SAUDI ARABIA—BAHREIN—QATAR
(Continued)

site of present production, is made up of a series of sedimentary rocks alternating calcareous and clastic facies ranging in age from early Paleozoic and lower Eocene. In Hasa, surface exposures are limited to Tertiary and later rocks including lower and middle Eocene and Miocene-Pliocene, and subordinate Pleistocene and recent deposits.

BAHREIN ISLAND

Oil production on Bahrein Island was opened in 1932 by the Bahrein Petroleum Company, Ltd., at that time wholly owned by the Standard Oil Company of California. In 1936, The Texas Company became 50 percent owner of the Bahrein Company. The field, covering approximately 10,000 acres, produces from three zones in the Arab at 2000-2250 feet and 4000-4600 feet. Of the 74 wells drilled to January 1, 1946, 62 were producing, four were observation wells, and 8 were shutin. Also, to January 1, 1946, the field had produced more than 70 million barrels of crude oil.

The 74 wells drilled have outlined the structure on Bahrein Island which is situated in about the center of the island. The producing area is about 7½ miles long and 2½ miles wide and consists of nearly 16,000 acres. Cable tools were used in early development of the field but since 1936 rotary equipment has been in use. A visible rim-rock of limestone virtually outlines the general limits of the field and there is no evidence of faulting.

Oil on Bahrein Island is produced from three pay zones known as the first pay, second pay and fourth pay. The third zone is not produced commercially. Of the pay zones, a majority of the production comes from the top two zones with the lower zone yielding some oil and high-pressure gas. The crude oil produced on Bahrein Island is about 33.5-gravity (API).

QATAR DEVELOPMENT

The Qatar Peninsula concession, owned by Petroleum Development, Ltd. (Iraq Petroleum Company) first came into oil production in 1940 with final completion of the Dukhan 1 at 5786 feet. The second well was completed at 6016 feet and by January 1, 1944, the field had two oil wells and one dry hole. The production is from the Kerkrit horizon, equivalent to the Arab zone in the Saudi Arabia fields with the oil being about 35.5-gravity. The field is an anticline about 35 miles long and about 3 miles wide. All the wells were plugged as a security measure in 1944 and now are being restored to production. Average thickness of the two producing wells is 50 to 85 feet.

So far four limestone formations have been developed in the Dukhan field. The first two zones are thin while the third zone, approximately 85 feet thick, produced oil in two wells and water in a third well. The fourth zone, about 350 feet below the first zone, has produced gas and water. Plans are to develop the third zone immediately.

The concession, held by Petroleum Development, Ltd., was made in 1935 and covers a period of 75 years.

Saudi Arabia Production

FIELD	Number of Wells		1945 Production (Barrels)		
	Drilling	Producing	Jan.-Nov.	Dec. (Est.)	Total
Damman	3	27	18,601,191	2,523,190	21,124,381
Qatif		1	113,160	56,000	169,160
Abqaiq[1]	1	4	17,455	.....	17,455
Abu Hadriya	1[2]	1[3]	.....	.....	.....

[1] No pipe line connection, production consumed in drilling.
[2] Shut down on January 1, 1946.
[3] Shutin, January 1, 1946.

Annual Crude Oil Production
(In Barrels)

YEAR	Bahrein	Saudi Arabia
Prior to 1939	22,287,055	580,000
1939	7,588,554	3,934,000
1940	7,073,919	5,074,838
1941	6,794,157	4,310,110
1942	6,240,627	4,530,492
1943	6,571,609	4,868,184
1944	6,713,795	7,800,000
1945	7,308,938	21,310,996
Total to January 1, 1946	70,578,654	52,408,620

CRUDE OIL REFINERIES

The completion of a new refinery at Ras Tanura, in Saudi Arabia, has increased the refining capacity of the Bahrein-Saudi Arabia sector from about 67,000 barrels daily to 127,000 barrels daily. This increased refining capacity has also reflected in the sharp gain made in daily oil production in the sector, especially in Damman field, Saudi Arabia.

Arabian American Oil Company completed its new refinery at Ras Tanura in December, 1945, and as of December 31, 1945, this plant was running approximately 60,000 barrels of crude oil daily. Also located at Ras Tanura is a small refinery with a daily capacity of 3000 barrels.

Bahrein Petroleum Company, Ltd., completed during 1945 additional refining facilities on Bahrein Island and at the end of the year the plant was running to stills approximately 64,000 barrels of crude oil daily.

Incident to the war program, the Bahrein Company installed facilities for making 100-octane gasoline at its refinery. However, because of the end of hostilities this equipment was shut down in October, 1945.

PIPE LINE FACILITIES

Oil production in the Bahrein-Saudi Arabia sector is actually gauged on pipe line and refinery facilities.

There is a network of three main trunk lines in this sector which feed oil to the refineries and tanker terminals at Ras Tanura and Bahrein. A 10-inch, 60,000-barrel capacity pipe line connects the important Damman field with Ras Tanura, a distance of about 39 miles. This line also goes through the Qatif field, important oil strike in 1945. Under construction is a 12-inch, 85,000-barrel capacity line to be laid directly from Damman across the bay to site of the refinery at Ras Tanura.

Arabian American Oil Company is completing a 40-mile, 12-inch carrier from the Abqaiq field to the pipe line terminal at Damman. Additional gathering lines also are being completed in the Abqaiq. These facilities will insure development of the Abqaiq pool.

The refinery on Bahrein Island is served by a 12-inch, 60,000-barrel line from the Damman field, a distance of 34 miles, with half of this mileage under the Bay of Salwa, between the Arabian mainland and Bahrein Island.

The Trans-Arabian Pipe Line Company, subsidiary of the Arabian American Oil Company, has been granted concession to construct a 1000-mile "big-inch" crude oil line across Palestine from Saudi Arabia to a Mediterranean port. Construction of such a line would materially boost the production in Saudi Arabian oil fields.

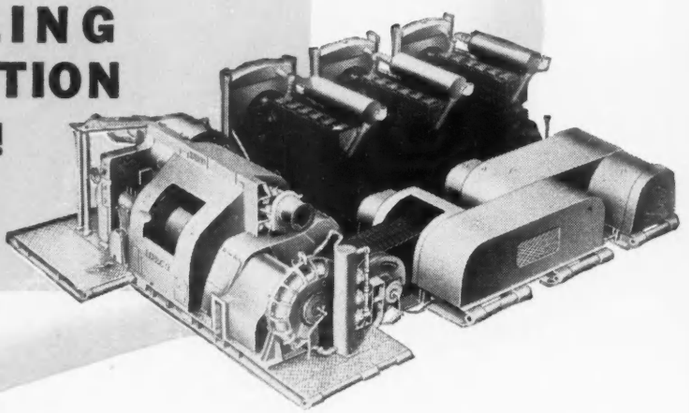
On Qatar Peninsula, Petroleum Development, Ltd., plans to construct a 10-inch, 20,000-barrel capacity pipe line from the Dukhan wells across the peninsula to loading facilities on the Eastern Mediterranean, a distance of 52 miles.

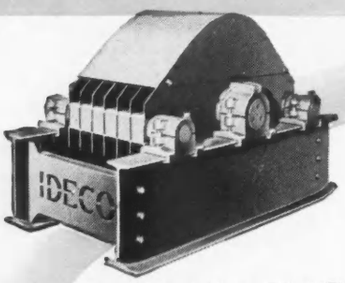
Everything

FOR DRILLING AND PRODUCTION

- - everywhere there's oil !

POWERHOIST—New smoothness of control with Airflex clutches and air-actuated controls. The modern rig for modern drilling. Capacities to 750 horsepower.





CROWN AND TRAVELING BLOCKS—Crown blocks in all types and sizes. Narrow and compact traveling blocks . . . only 30½ inches wide in 300-ton size. Speed blocks for portable masts.

SWIVELS—Designed for faster drilling, easier handling . . . available in six and eight-inch sizes.

Whether it's a problem of a single unit to speed the job, or complete equipment for a new drilling rig . . . IDECO can supply it.

Equally important . . . these IDECO products are conveniently available in every active oil field through one of the largest distributing organizations in the industry . . . IDECO Sales Outlets plus those of associated distributors.

Take advantage of this time-saving service—centralize responsibility with IDECO!

* * *

For complete details on all equipment, contact your IDECO representative now!

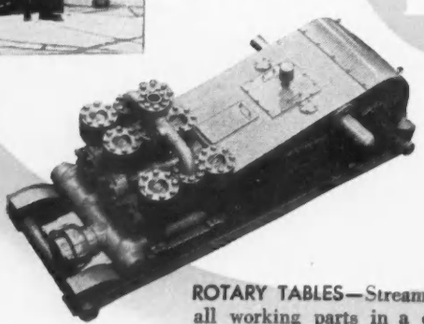
INTERNATIONAL DERRICK & EQUIPMENT CO.

Regional Sales Offices: Columbus 8, Ohio; Dallas 1, Texas; Los Angeles 13, Calif. . . . Export: 122 East 42nd Street, New York 17, New York . . . Sales Offices, Stores and Distributors in all active oil fields.

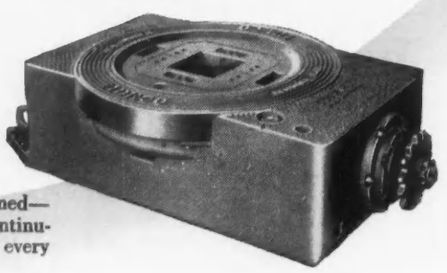
GEARED PUMPERS—Complete range of sizes now available—proved in the field by years of constant service.

IDECO

One of the Dresser Industries

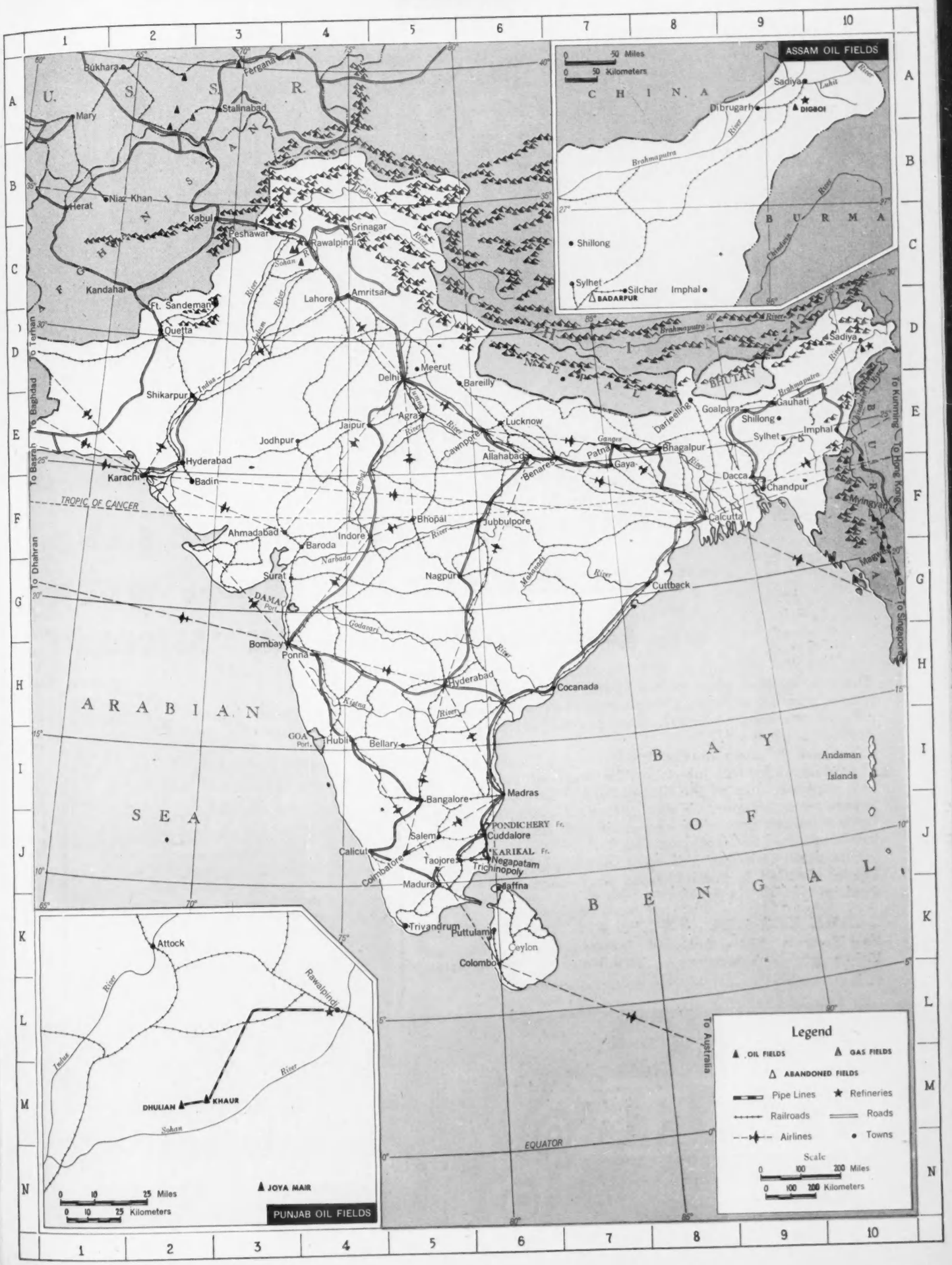


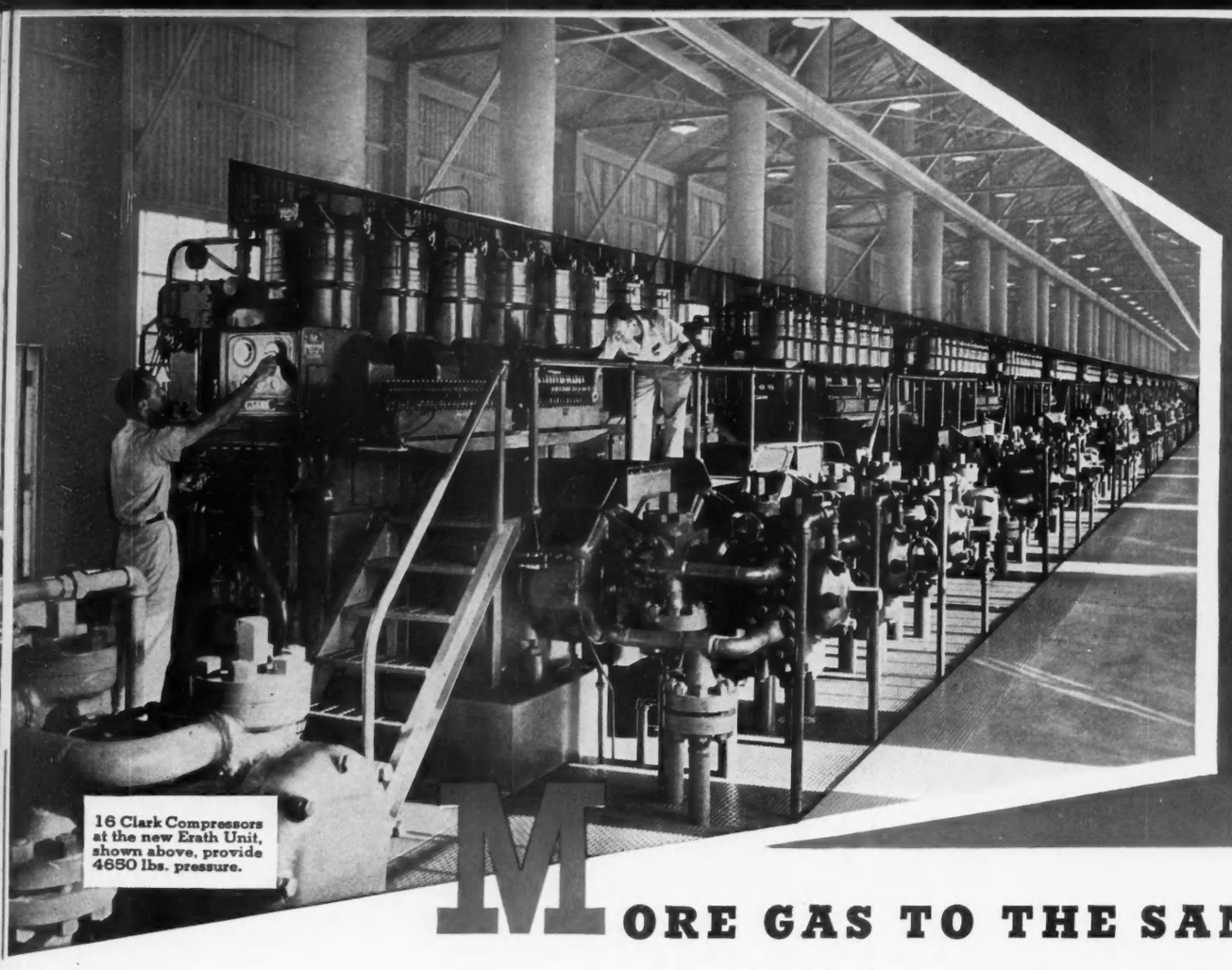
SLUSH PUMPS—Clark Triplex Steel Slush Pumps—another Dresser Industries product—supplement the drilling and production equipment supplied by IDECO.



ROTARY TABLES—Streamlined—all working parts in a continuous bath of oil. A size for every requirement.

INDIA


ASSAM OIL FIELDS
0 50 Miles
0 50 Kilometers
C H I N A
B U R M A
Sadiya
Dibrugarh
DIGBOI
Lohit River
Brahmaputra River
Chindwin River
Shillong
Sylhet
Silchar
Imphal
BADARPUR
U. S. S. R.
Bukhara
Fergana
Stalinabad
Mary
Herat
Niaz-Khan
Kabul
Peshawar
Srinagar
Rawalpindi
Kandahar
Ft. Sandeman
Quetta
Lahore
Amritsar
Sohan River
Jhelum River
Indus River
To Tehran
To Baghdad
To Basrah
Shikarpur
Delhi
Meerut
Bareilly
Jaipur
Agra
Lucknow
Jodhpur
Hyderabad
Karachi
Badin
Allahabad
Benares
Patna
Gaya
Bhagalpur
Darjeeling
Goalpara
Gauhati
Shillong
Sylhet
Imphal
Dacca
Chandpur
Mymensingh
Calcutta
To Kunming
To Hong Kong
TROPIC OF CANCER
Ahmadabad
Baroda
Indore
Bhopal
Jubbulpore
Narbada River
Surat
DAMAN Port
Nagpur
Mahanadi River
Cuttback
Godavari River
Bombay
Ponna
Hyderabad
Cocanada
Kistna River
ARABIAN SEA
GOA Port
Hubli
Bellary
BAY OF BENGAL
Andaman Islands
Bangalore
Madras
PONDICHERY Fr.
Cuddalore
KARIKAL Fr.
Negapatam
Salem
Calicut
Taojore
Trichinopoly
Coimbatore
Madura
Jaffna
Trivandrum
Puttulami
Ceylon
Colombo
To Dhahran
To Singapore
To Australia
EQUATOR
Legend
OIL FIELDS
GAS FIELDS
ABANDONED FIELDS
Pipe Lines
Refineries
Railroads
Roads
Airlines
Towns
Scale
0 100 200 Miles
0 100 200 Kilometers
Attock
Rawalpindi
Indus River
Sohan River
DHULIAN
KHAUR
JOYA MAIR
0 10 25 Miles
0 10 25 Kilometers
PUNJAB OIL FIELDS



16 Clark Compressors at the new Erath Unit, shown above, provide 4650 lbs. pressure.

MORE GAS TO THE SAND AT HIGHER PRESSURE WITH 12,800 H.P. OF CLARK "ANGLES"

The new cycling plant of the Erath Unit at Erath, Louisiana, where the Texas Company is the operator, breaks all previous records by returning gas to the formation at 4650 lbs. pressure.

The design and manufacture of the 16 Clark "Angle" Compressors for this job called for precision engineering and workmanship of the highest order. Compressor cylinders were designed to meet the exact operating conditions to which they would be subjected. Extremely close tolerances had to be maintained.

The basic economy and dependability of the Clark 2 Cycle "Angle" is demonstrated once more in the most modern type of plant.

CLARK BROS. CO., INC. • OLEAN, N. Y.
New York · Tulsa, Okla. · Houston, Tex. · Chicago
Boston · Los Angeles · London · Buenos Aires

CLARK COMPRESSORS CUT COSTS

1. Cut fuel costs—Reason: Super 2 Cycle fuel injection.
2. Cut transportation and erection costs—Reason: lighter weight—more easily installed.
3. Cut foundation and floor space costs—Reasons: compact "Angle" design—inherent balance.
4. Cut maintenance costs—Reason: extreme mechanical simplicity.

CLARK

ONE OF THE DRESSER INDUSTRIES

SETS THE PACE IN COMPRESSOR PROGRESS

INDIA

ASSAM AREA

INDIA has two oil producing areas—Assam and Punjab—both operated by British companies. The oldest of these areas is Assam in which drilling and production began as early as 1888.

The only field presently producing in the Assam area is Digboi which is operated by Assam Oil Company, Ltd., the controlling interest in which is held by Burmah Oil Company. Situated in the Lakhimpur district of Upper Assam, the Digboi structure is sharply folded, the northern flank is overturned and faulted, and the closure is great. The producing formation is in the Miocene sand.

The oil from Digboi is a paraffin-base crude containing solid paraffins of a high melting point. At the end of 1945 the field was producing at the rate of 5000 barrels daily from more than 200 wells. The oil is dark green in color and its gravity is 35.8 degrees (API). Approximately 400 wells have been drilled in the field with producing depths ranging from 500 feet down to 5000 feet. The productive area of the field is about three and one-half miles in length and three-fourths mile in width. The Digboi field resembles the Yenangyaung field in Burma in correlation.

Badarpur field—This field was developed on a small scale by Badarpur Oil Company, which was taken over by Burmah Oil Company in 1915. More than 60 wells were drilled in this area, located in the eastern part of Surma Valley, but all are now abandoned. This anticline is a small dome having a steep, faulted eastern flank. The decline in production was rapid and the wells produced a great amount of water.

Masimpur area—Burmah Oil Company has been active in this sector since 1916 but so far the results have been disappointing. A few wells have been drilled and produced some oil.

Other areas—Several tests have been drilled at Patharia but have proved unsuccessful. Petroleum deposits exist along the southern edges of the Khasi and Jainta Hills and considerable prospecting has been done near the Shillong Plateau. North and northwest of Badarpur are oil seepages on a monocline along the southern boundary of the Shillong Plateau. Farther east and north are oil showings on fault structures of the Naga Hills. The thrust planes are steeply inclined and the usual distance between thrusts is only three or four miles. Several wells have been drilled but oil has not been discovered in commercial quantities.

PUNJAB AREA

All the production in the Punjab province of India comes from three fields—Khaur, Dhulian and the recently discovered Joya Mair pool—and are operated by Attock Oil Company, Ltd.

Joya Mair field—This field, discovered in May, 1944, is located in the northwest part of the Punjab and at present has two producers, shutin, and a third test drilling. The field's oil comes from limestone in the Eocene formation at about 7000 feet. The structure at Joya Mair is defined as an anticline and covers a wide area.

The oil produced at Joya Mair is 19-gravity (API) and is a highly viscous, black oil that rapidly loses its lighter constituents on exposure and becomes solid pitch. It is one of the most asphaltic crudes yet encountered in commercial quantities in any part of the world. A special refinery may be built to process this crude.

Burmah Oil Company holds a concession adjoining the Attock discovery and plans to drill a test soon. About 12 miles from the Joya Mair field, Attock has a deep test active.

Khaur field—Shallow production in this field was first found at 500 feet in 1914. The Attock company since has drilled more than 300 wells in the field, some of which have produced from as shallow as 100 feet and others as deep as 5000 feet. The structure is an anticline with the production being from the Miocene sand. The gravity of the oil is about 35 degrees (API). Peak production exceeded 500,000 barrels in 1929 but present output is about 300 barrels daily.

Dhulian field—At present, the Dhulian field is the largest producing field in the Punjab. The field is located about 10 miles southwest of Khaur and is on an anticlinal dome. The oil is about 36.8-gravity (API) and is produced from limestone in the Eocene formation below 7000 feet. The deep discovery was made in 1937 and the first two wells completed flowed approximately 1200 barrels of greenish black oil daily. However, in spite of recent continued drilling operations the field's production has steadily declined and present production is estimated at about 700 barrels daily. The Dhulian field covers a surface area of about six miles in length and two miles in width.

A topping plant at the field processes a small amount of crude with a major portion of the oil being piped to the refinery at Rawalpindi. The residue from the field plant is used for fuel oil.

PUNJAB CRUDE OIL PRODUCTION

Wartime production of the fields in the Punjab district of India was recently released by Attock Oil Company and shows a gradual decline from 1941. Annual output in 1939 was 757,744 barrels; 1940—767,302 barrels; 1941—885,780 barrels; 1942—780,721 barrels; 1943—594,845 barrels; 1944—410,864 barrels; 1945—324,870 barrels.

REFINERIES

Two refineries are operating in India, one at Digboi and the other at Rawalpindi.

The Digboi plant is operated by Assam Oil Company, Ltd., and receives its crude oil from the Digboi field. This plant has a crude charging capacity of 6000 barrels daily and an additional cracking capacity of 2100 barrels daily.

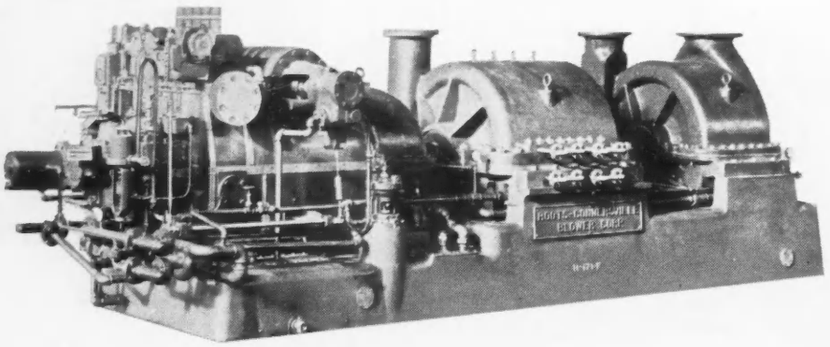
The Rawalpindi refinery is operated by Attock Oil Company, Ltd., and is served by a 52-mile pipe line from the Dhulian and Khaur fields. The crude charging capacity of the plant is 4000 barrels daily with an additional cracking capacity of 2500 barrels daily.

Construction of additional refining facilities by the Attock company to handle the highly viscous, black oil produced at Joya Mair is reported under consideration. The low gravity oil produced in this field has been found to be unsuitable for treatment in the existing refinery at Rawalpindi. Research now is under way.

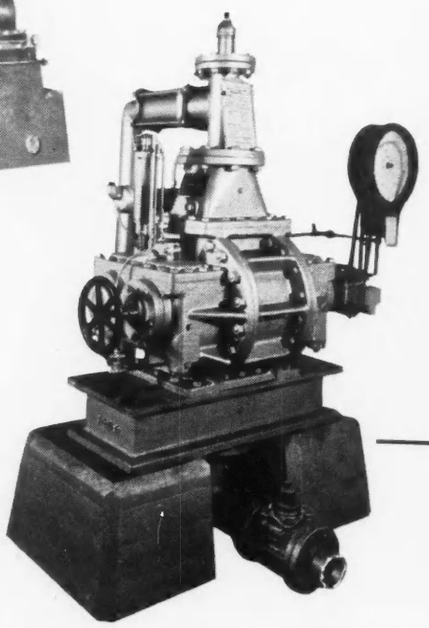
Engineering and Geological Data on India's Oil Fields

Field, District	Location on Map Page 271	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION			
				Kind (Lime, Sand, etc.)	Age	Depth of Wells (Ft.) Minimum Top Pay	Depth of Wells (Ft.) Maximum Total Depth
Assam District:							
Digboi	D-10	200	35.8	Sand	Miocene	500	5000
Punjab District:							
Khaur	C-4	....	35	Sand	Miocene	100	5000
Dhulian	C-4	....	36.8	Lime	Eocene	...	7000
Joya Mair	C-4	....	19	Lime	Eocene	...	7000

Structure is an anticline in each field.



A typical R-C Centrifugal Compressor Unit for higher pressures. Two relatively standard compressor bodies with common drive, operating in series with intercoolers. This arrangement makes practical the development of higher delivery pressures for air or gas than can be obtained in a single-bodied unit.



R-C Rotary Positive Displacement Meters accurately measure substantially above or below normal ratings, from 1,000 to 1,000,000 CFH.

R-C *dual-ability* BUILDS CENTRIFUGAL AND ROTARY POSITIVE UNITS

When you're operating far from supply bases, you'll value highly the long-time dependability and accuracy of Roots-Connersville Gas Pumps and Meters.

For Gas Pumps, R-C *dual-ability* gives you the choice of Centrifugal or Rotary Positive designs, whichever is best adapted to your needs. In either case, you are assured of advanced engineering and sturdy, durable construction.

For Meters, the simple Rotary Positive Displacement principle has long been proved for close accuracy and trouble-free performance. R-C equipment is suitable for handling either gas or oil.

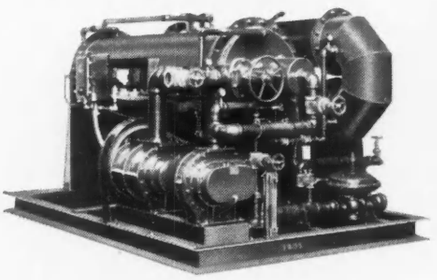
Both Meters and Gas Pumps are available in standard units in a wide range of capacities and pressures; or, our engineers will gladly develop special designs to fit your specific needs. Consult us, without obligation.

ROOTS-CONNERSVILLE BLOWER CORPORATION

One of the Dresser Industries

605 Worden Avenue, Connersville, Indiana

REDUCE EXPLOSION HAZARDS with R-C Inert Gas Generators



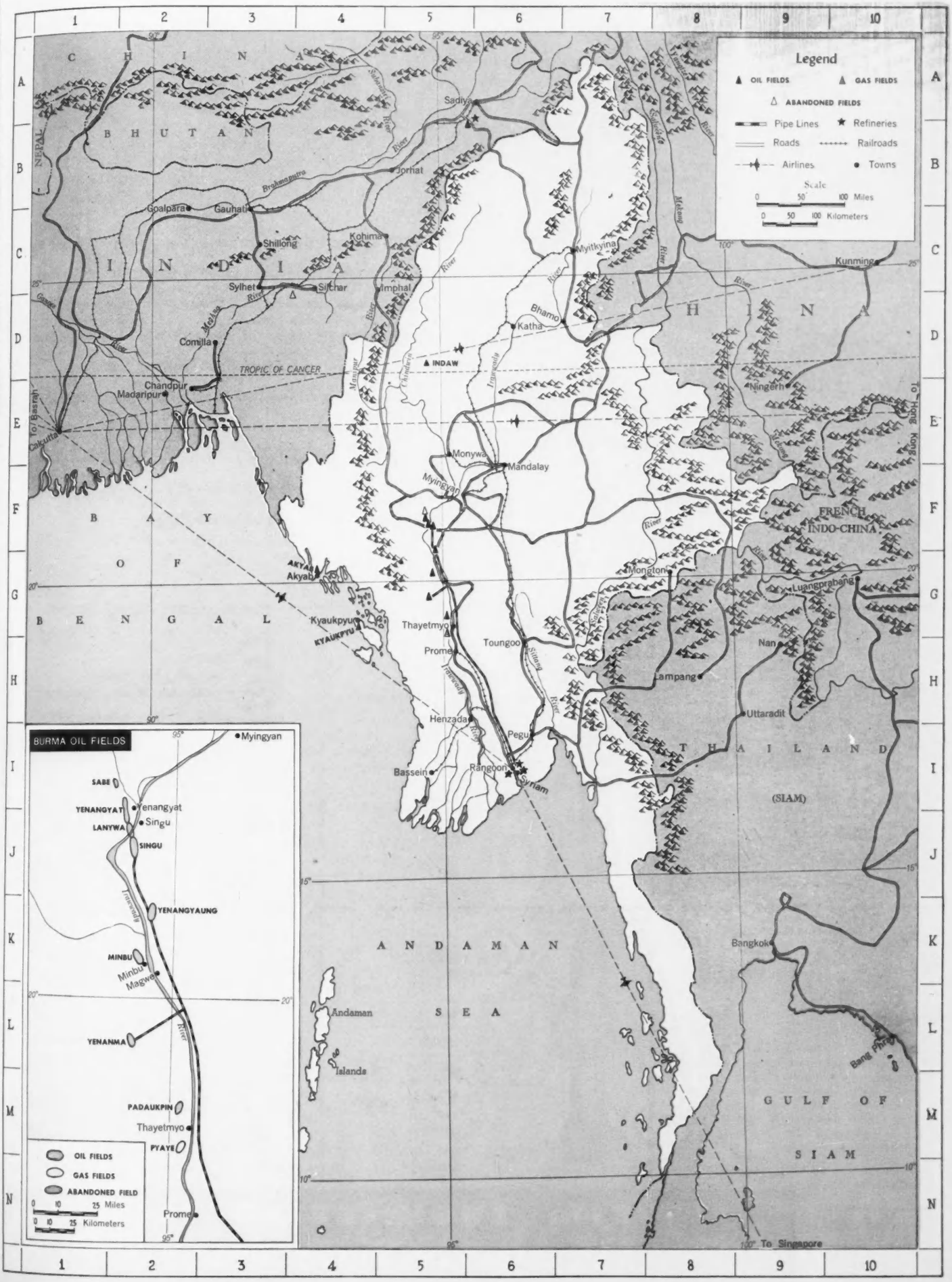
For simple, dependable protection against explosion or fire hazards of inflammable gas or liquids, R-C Inert Gas Generators are the *safe* answer. They produce oxygen-free gas at low cost. They burn gas or oil. They are built to give you long-time, trouble-free performance, Ask for details.

GAS HANDLING EQUIPMENT

Roots CONNERSVILLE SINCE 1854

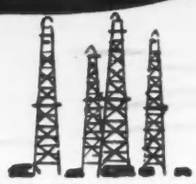
ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

BURMA


Legend
OIL FIELDS
GAS FIELDS
ABANDONED FIELDS
Pipe Lines
Refineries
Roads
Railroads
Airlines
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
BURMA OIL FIELDS
OIL FIELDS
GAS FIELDS
ABANDONED FIELD
0 10 25 Miles
0 10 25 Kilometers
CHINA
INDIA
BHUTAN
NEPAL
BAY OF BENGAL
ANDAMAN SEA
GULF OF SIAM
THAILAND (SIAM)
FRENCH INDO-CHINA
Sadiya
Jorhat
Goalpara
Gauhati
Shillong
Kohima
Sylhet
Silchar
Imphal
Myitkyina
Kunming
Bhamo
Katha
Comilla
Chandpur
Madaripur
Calcutta
INDAW
TROPIC OF CANCER
Monywa
Mandalay
Myingyan
Akyab
Kyaukpyu
Thayetmyo
Prome
Toungoo
Henzada
Pegu
Bassein
Rangoon
Syriam
Mongton
Ningerh
Luangprabang
Nan
Lampang
Uttaradit
Bangkok
Andaman Islands
To Basrah
To Hong Kong
To Singapore
Myingyan
Yenangyat
Singu
Yenangyaung
Minbu
Magwe
Yenanma
Padaukpin
Thayetmyo
Pyaye
Prome

CONTINUED ADVANCEMENT OF THE OIL INDUSTRY

IS DEPENDENT UPON CONSTANT DEVELOPMENT OF NEW TECHNIQUES AND BETTER PERFORMANCE OF PRESENT EQUIPMENT



FROM THE DAY fifteen years ago when we introduced the Sievers Reamer to the oil industry, operators have attested to the quality performance of Security tools. In Arabia...South America...the Orient...wherever men drill for oil, Security is recognized for its leadership in pioneering new techniques and developing equipment of improved designs. By combining constant research...finest materials...precision workmanship and and alert supervision in the manufacture of its equipment, Security Engineering Company has attained pre-eminence in its mission of world-wide service to the industry. And it is Security's aim to continue its services on an ever-widening scale.

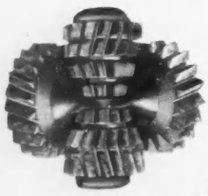
HERE ARE THE *Security* PRODUCTS That are Making Oil History

SIEVERS REAMER

The one reamer that will ream to the full desired dimension by shearing all excess formations from the walls of the hole. An unexcelled stabilizer. The cutters have circumferential contact with 30% to 35% of the hole as well as vertical contact over their entire length.

SECURALOY, DRILLABLE PIPE, PACKERS, LINER HANGERS AND ACCESSORIES

The use of this drillable metal for subsurface operations greatly increases the efficiency of production and completion work. Securaloy saves operators millions of dollars by safeguarding oilfield investments from the dangers of frozen equipment ...choked production and premature abandonment.



SECURITY ROCK BITS

Field proven for 15 years, these bits are designed for full gauge, straight hole digging. The high center cone gives extraordinary stabilization. Ten-cutter combinations, each designed for a particular class or type of formation, provide for all kinds of digging.

SECURITY 3-CUTTER HOLE OPENERS

Unexcelled for opening up coreholes or rat holes drilled ahead of the initial bore, they produce enlarged holes having perfect concentricity with the pilot bore. The most rugged and efficient tools of their kind on the market.

SECURITY CASING SCRAPER

Employing the same shearing principle that makes the Sievers Reamer so effective, this tool cleans out casing faster, cheaper, easier, removing obstructions within casing walls, assuring free downward passage of tools and equipment. It is especially valuable for cleaning casing after gun perforating.

SECURITY ENGINEERING CO., INC.

ONE OF THE DRESSER INDUSTRIES

Main Office and Plants: Whittier, California

EXPORT OFFICE: SUITE 800, CHANIN BUILDING, 122 EAST 42ND STREET, NEW YORK 17, NEW YORK

Branches in All Principal Oil Fields

BURMA

GENERAL INFORMATION

A CASUALTY of war twice since 1942—first when Britain applied her denial policy and later when the Japanese gave way to Allied armies—the oil fields of Burma are gradually being restored to production.

In 1942, when British interests destroyed the wells and refineries instead of leaving them intact for the Japanese, Burma's production was estimated at 7,762,000 barrels annually, or about 21,500 barrels daily. During Japanese occupation, restoration of the wells was effected to the extent of about 5650 barrels daily. Following the recapture of the producing area by the Allies, production in 1945 was estimated at about 750,000 barrels.

Besides a host of smaller companies, there are three major companies operating in Burma, the largest being Burmah Oil Company. The other two are British Burmah Petroleum Company and Indo-Burma Petroleum Company. In 1937, the largest independent operator was listed as Nath Singh Oil Company.

PIPE LINE AND REFINERIES

With the exception of a small quantity processed in a few local topping plants, Burma's oil, prior to the war, was refined at Burmah Oil Company's Syriam refinery, near Rangoon. This refinery has been out of action since its destruction by the British to prevent its use by the Japanese. The refinery had a rated capacity of 20,000 barrels daily with a cracking capacity of 3000 barrels.

Under normal operation, a pipe line connected the plant with Burmah Oil Company's producing fields. This system consisted of a 4-inch line from the Yenangyat field to Singu, 8-inch from the Singu field to Yenangyaung, and 10-inch trunk line from that field to the refinery at Rangoon, a distance of approximately 300 miles. This pipe line also was a war casualty.

BURMA OIL FIELDS

Yenangyaung field—The Yenangyaung field consists of a number of areas, locally called Khangone, Twingone, Beme Chaung, and Minlindaung. This series of productive areas extends approximately seven miles in length from north to south and about three-quarters of a mile in width.

In this field the Irrawaddy series is believed to overlie the Pegu unconformably; in fact, an overlap can be seen on the Yenangyaung anticline where Yenangyaung Creek has cut through the structure near Khodaung. The productive portions of the Pegu are at least 2000 feet thick and probably more.

Oil has been extracted at Yenangyaung for several centuries. Until the Japanese occupation, descendants of the original oil workers were still operating the 300-400-foot hand-dug wells. A short distance away, company-owned wells were being operated by the most up-to-date methods. At least 4375 wells were located in the Yenangyaung area which is notable for a remarkably long continuity of yield.

Chauk fields—This area, one of the most important in Burma, comprises the Singu, Lanywa, Yenangyat and Sabe fields, which are situated on one geologic structure, a long, asymmetric anticline similar to Yenangyaung, but with the asymmetry reversed, the steep dip here being to the eastward. Irrawaddy River, which at Chauk is normally about two-thirds of a mile wide, crosses the structure north of its center, separating the Singu area on the southeast from Lanywa and Yenangyat on the northwest. Singu is much the most important of the group.

Singu was developed chiefly by three large companies. One large block is held jointly by British-Burmah Petroleum Company and Indo-Burma Petroleum Company, and is operated by a subsidiary. The other operator is Burmah Oil Company.

About 955 wells had been drilled at Singu before the war, with production ranging from a few gallons to as high as 1600 barrels per well daily and depths from 1800 to 5000 feet. Six productive zones have been proved but between these are water-bearing strata.

The Lanywa field is held by Indo-Burma and is virtually a northwest extension of the Singu field. There are about 125 wells in the field producing from depths of 1700 to 3200 feet. Water troubles are negligible in this field.

The Yenangyat and Sabe fields are structurally continuous with that at Singu. Wells in the Sabe area are not now producing. Yenangyat is characterized by extremely rough topography. Approximately 450 wells have been drilled in these two areas, in addition to the native hand-dug wells, some of which still produce.

Indaw field—This field in the Upper Chindwin district is the most northerly of the Burmese fields and is held under lease by Indo-Burma. Because the field is about 20 miles east of Chindwin River nearly 300 miles from its junction with the Irrawaddy River it is almost inaccessible. The structure is a low dome. The oil produced at Indaw is stored at the field during low-water season and then during high-water is piped to the river and transported by barge to Rangoon.

Thayetmyo district—The area is composed of the Yenanma and Padaukpin fields. All wells are cable-tool holes ranging from 600 to 1700 feet in depth. At Pyaye, eight miles south of Thayetmyo, Indo-Burma has a dry gas field producing from about 2600 feet.

Minbu fields—In this area are situated the fields of Minbu Town, Palanyon, and Yethaya, separate pools but generally grouped together. They are along the crest of an anticline similar to the Singu-Lanywa-Yenangyat anticline, steeply asymmetric and locally overturned. The productive area is very narrow.

Other areas—About 40 miles northwest of Pakokku, between Chauk and the Indaw fields, Nath Singh Oil Company had some production at about 750 feet in the Leya-Okpo field. Recent development is unknown. Other oil areas are Akyab, directly west of Minbu, and Kyaukpyu, west of Thayetmyo. The production at Akyab has been small but steady.

* * *

The cooperation of the geological department of the Burmah Oil Company, Ltd., is gratefully acknowledged.

Engineering and Geological Data on Principal Burma Oil Fields

FIELD	Location on Map Page 275	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION				
				Kind (Lime, Sand, etc.)	Age	Depths of Wells (Ft.) Minimum Top Pay	Depths of Wells (Ft.) Maximum Total Depth	Type Structure
Yenangyaung	F-5	850	37.0	Sand	Miocene-Oligocene	350	5000	Anticline
Singu-Lanywa	F-5	2500	39.6	Sand	Oligocene	2000	5000	Faulted Anticline
Yenangyat	F-5	....	38.8	Sand	Oligocene	400	4200	Asymmetric Anticline
Indaw	D-5	160	31.1	Sand	Miocene	....	2000	Anticline
Yenanma	G-5	40	....	Sand	Oligocene	600	1700	Monocline
Minbu	G-5	....	37.8	Sand	Miocene-Oligocene	Shallow		Anticline]

● In Ft. Norman's 60 degrees below or Iran's 120 degrees above, rust and corrosion are continuously at work. No country, no climate is immune from this world-wide problem.

But corrosion can be checked with RUST-BAN*, the most complete line of rust-preventives on the market today. RUST-BAN is the result of years of laboratory development and long use under actual field conditions. RUST-BAN products successfully combat practically any rust or corrosion problem that may arise and each product gives outstanding protection in the service for which it is recommended.

RUST-BAN PRODUCTS

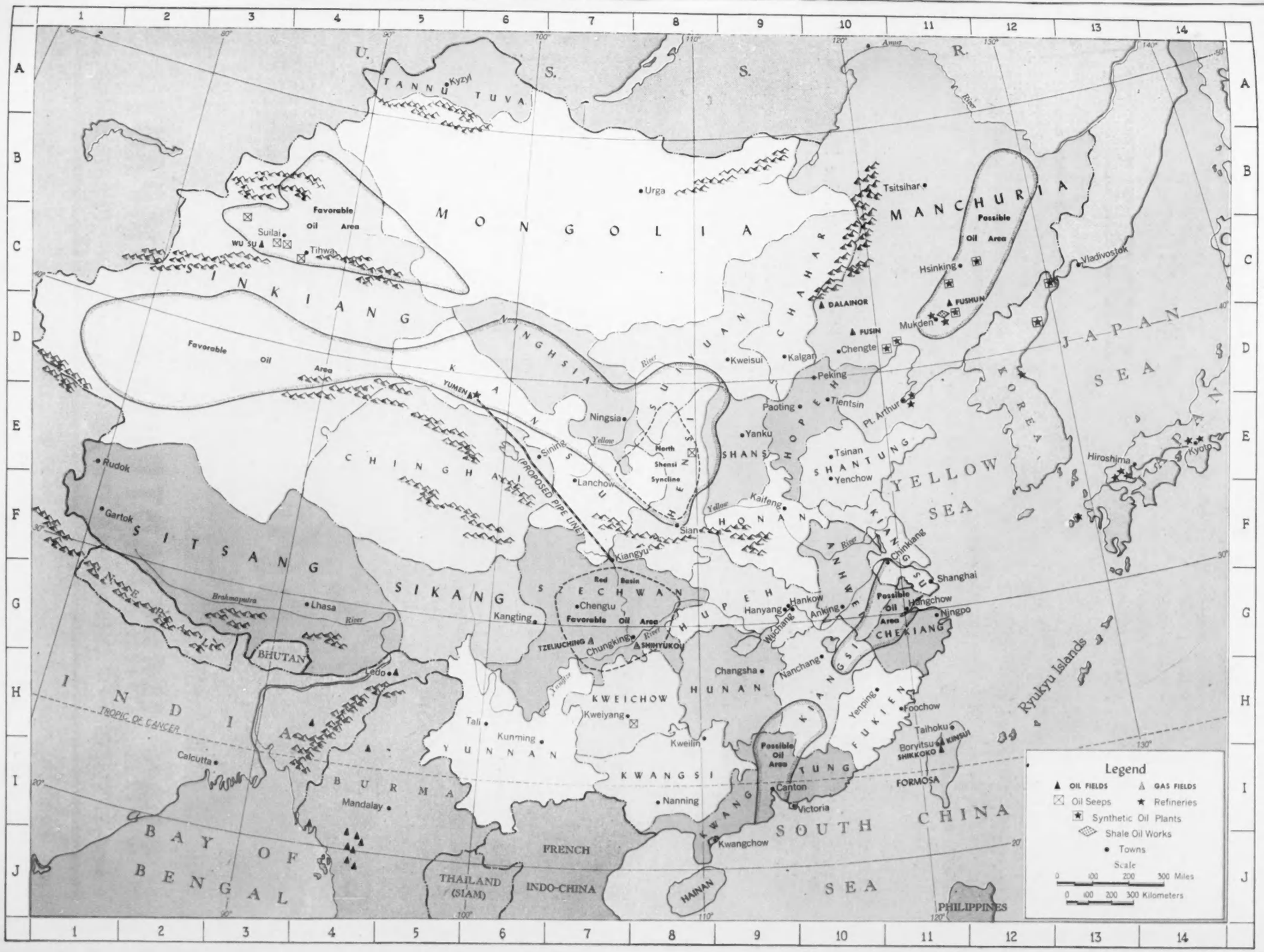
1. THE HARD DRYING TYPE—Products which dry hard like paints.
2. SLUSHING TYPE UNPIGMENTED — Products which do not dry hard.
3. SLUSHING TYPE PIGMENTED—Similar to 2 but with pigments incorporated in their formulas.
4. THINNERS—Thinners and reducers for use with Rust-Ban products.
5. COATING BITUMENS—Protective coatings for underground service.

For specific information on any rust problem, consult your nearest RUST-BAN marketer

RUST-BAN

RUST-BAN is sold by: Colonial Beacon Oil Co., Boston, Mass.; Standard Oil Co. of Pennsylvania, Philadelphia, Pa.; Standard Oil Co. of New Jersey, New York, N. Y.; Humble Oil & Refining Company, Houston, Texas; The Carter Oil Company, Tulsa, Okla.; Standard Oil Company (Ky.), Louisville, Ky.; Standard Oil Company (Ohio), Cleveland, Ohio; Penola Inc.; Pittsburgh, Pa., and Imperial Oil Ltd., Toronto, Canada.

RUST-BAN—First Line of Defense Against Rust


CHINA
U. S. S. R.
MONGOLIA
MANCHURIA
SINKIANG
KANSU
NINGHSIA
SUIYUAN
CHAHAR
JEHOL
SHANSI
SHANTUNG
HONAN
SZECHWAN
HUPEH
HUNAN
KWEICHOW
YUNNAN
KWANGSI
KWANGTUNG
FUKIEN
CHEKIANG
KIANGSU
ANHWEI
KIANGSI
SIKANG
TSINGHAI
SITSANG
BHUTAN
INDIA
BURMA
FRENCH INDO-CHINA
THAILAND (SIAM)
HAINAN
FORMOSA
JAPAN SEA
KOREA
YELLOW SEA
SOUTH CHINA SEA
PHILIPPINES
Ryukyu Islands
BAY OF BENGAL
TROPIC OF CANCER
Favorable Oil Area
Possible Oil Area
Red Basin
North Shensi Syncline
(PROPOSED PIPE LINE)
Urga
Tsitsihar
Vladivostok
Hsinking
Mukden
DALAINOR
FUSHUN
FUSIN
Chengte
Kweisui
Kalgan
Peking
Paoting
Tientsin
Pt. Arthur
Yanku
Tsinan
Yenchow
Hiroshima
Kyoto
Ningsia
Lanchow
Sining
YUMEN
Suilai
Tihwa
WU SU
Kaifeng
Sian
Kiangyu
Rudok
Gartok
Lhasa
Brahmaputra River
Kangting
Chengu
Chungking
TZELIUCHING
SHINYUKOU
Hanyang
Hankow
Wuchang
Anking
Chinkiang
Shanghai
Hangchow
Ningpo
Changsha
Nanchang
Yenping
Foochow
Taihoku
Boryitsu
SHIKKOKO
KINSUI
Ledo
Tali
Kunming
Kweiyang
Kweilin
Nanning
Canton
Victoria
Kwangchow
Calcutta
Mandalay
Legend
OIL FIELDS
GAS FIELDS
Oil Seeps
Refineries
Synthetic Oil Plants
Shale Oil Works
Towns
Scale
0 100 200 300 Miles
0 100 200 300 Kilometers

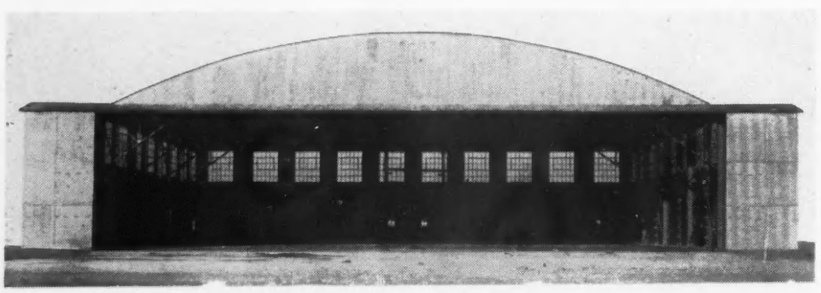
Manufacturers of

Airplane Hangars
Warehouses
Manufacturing Plants
Gasoline Plants
Bulk Stations
Boiler Houses
Booster Stations
Pump Houses
Engine Houses
Machine Shops
Garages
Freight Docks
Office Buildings

Starbilt

SECTIONAL STEEL BUILDINGS

Manufacturing experience assures the permanency of all Star Pre-Fabricated All-Steel buildings. These oil field warehouses illustrate two types of construction.



Here is a typical Star Pre-Fabricated, sectional, all steel hangar such as those in use by major airlines and oil companies all over the world.

This bulk warehouse at Houston is made from all steel sections Pre-Fabricated at the Star Factory. Trusses are electrically welded throughout. Erection time five days.

This Cities Service warehouse illustrates the clean cut lines that are typical of all Star installations.

STAR MANUFACTURING COMPANY

3012 S. STILES **OKLAHOMA CITY, OKLAHOMA** **PHONE 2-5105**

CHINA

CHINA'S OIL PROSPECTS

ALTHOUGH evidences of oil and gas found in many places in China suggest a future petroleum industry of fair proportions, development of this resource has been slow, and the only production of oil considered of commercial value is in the Yumen field in the western part of Kansu province.

Szechuan province, in which is located Chungking, site of China's national government, holds much favorable prospects for oil and gas development. In this province are located the Tzeliutsing, Shihyoukow and Shentungshan gas fields and the Kiangyu structure where a sizeable gas seepage exists.

The Wu Su field, located in the northern part of Sinkiang province, only 200 miles from the border of Russian Turkestan, was the first developed oil field in China. This oil area was discovered in 1937.

Other provinces of China which hold oil possibilities include Kweichow, Shensi, Kwangtung, Kiangsi, and Chekaing.

YUMEN OIL FIELD

The Yumen field is situated about 50 miles west of Suchow and is just 16 miles south of the old Silk Road, the principal highway through Kansu. Although popularly known as the Yumen field it is also referred to as "Laochunmiao."

Discovered in February of 1939, it is only now that the Chinese National Resources Commission is finding it possible to take steps toward full definition of the producing possibilities of the area. Recently the commission has retained the firm of Hoover, Curtice and Ruby of New York and Universal Oil Products Company to make surveys and recommendations.

The first three wells in the Yumen field were completed from the shallowest of three producing levels discovered to date, and have since been abandoned after producing for a while as small pumpers. In 1941, the fourth well was carried past the shallow 375-foot sand, picking up the first of three sands found in what has been designated as the "L" zone of the Tertiary. This well found high pressures unexpectedly and blew out and burned before being completed as a producer. The same difficulties were experienced in drilling several of the "L" sand wells which were abandoned after blowouts. One of the producing wells flowed more than 357,000 barrels of oil in slightly more than a year before sanding up. Since then two other sands have been found in the same zone, totaling in the three sands, an average thickness of 83 feet of pay. The field's deepest well was drilled to 2160 feet and found a sand at 1638 feet, a 56-foot body which is known as the "M" sand. Thus far it has not been too encouraging in this particular well, having low porosity and permeability.

Experts have estimated that using an average sand thickness of 83 feet and figuring on only 60 percent ultimate recovery, the field should produce more than 45.5 million barrels of oil from the presently proved area of less than 600 acres. From present information the producing area may well be assumed to be more than twice that amount with an ultimate recovery of more than 100 million barrels of oil. To February of 1945, the last date for which accurate figures are available, the field has produced a total to 1,379,000 barrels, with 1,347,000 barrels from the "L" sands.

Structurally the field is located on a half dome anticline which is very apparent on the surface. It trends in a general east-west direction with 15 to 20-degree dips on the southern flank in the central portion getting steeper toward the ends with extreme dips on east and west ends. Several pronounced seepages have been noted in the area, with one strong seepage extending over several acres.

During the latter part of 1945 there were 12 wells in the field considered to be capable of production, with an average of 9 wells producing at all times. These were flowing and making a total daily average of 1500 barrels of oil. The oil averages 32.3-gravity and has a high paraffin content.

SZECHUAN BASIN

The Szechuan Basin, in central western China bordering on the highlands of Tibet, is a relative lowland of Cretaceous rocks surrounded by highlands of older strata. The basin is rather extensive, roughly rectangular in shape.

The Tzeliutsing gas field, located in Szechuan province, is the site of perhaps the oldest gas field in the world from the standpoint of commercial development. It is the area producing much of China's salt, and the gas is found in wells drilled for brine, the gas being used as fuel under the evaporating pans for manufacturing salt. Drilling for brine here has been carried on for more than 2000 years. The field produces 2,800,000 cubic feet of gas daily. In all some 210 wells produce gas only, 96 wells produce yellow brine, and 46 wells make black brine. Gas comes from Triassic formations.

Gas producing areas have also been discovered at Shihyoukow and at Shentungshan, both in the Szechuan Basin. Also in this basin is the Kiangyu structure where a sizeable oil seepage exists and where a well now is being drilled. This wildcat test is thought to be the best located for testing the oil possibilities of the entire northwestern part of the basin. The location is a half mile west of the coal mine at Yunghsing where the seepage was discovered in fissures of green clay. The flow of oil and gas is coming from a point about 50 feet below the top of the Jurassic.

The Shihyoukow gas field was opened in May, 1940, and to date only two wells have been drilled, the first being a gas producer, and the second abandoned before reaching the depth of gas production in the first well. The first test was drilled to 4556 feet. First showing of oil was at 137 feet with the Jurassic being topped at 2415 feet and the Triassic at 3614 feet. The gas producing horizon of porous gray limestone was found at 3624-40 feet. A reserve of 100 million cubic feet of gas is indicated.

OTHER DEVELOPMENTS

China's first oil discovery was the Wu Su field in northwest Sinkiang province. The exploration and drilling were carried out by Russian engineers and crews. The Russians withdrew from the area in 1941 (or 1943), according to reports, and took field installations and equipment with them, but turned over to the Chinese about 25 producing wells that had been capped and left for future operation. The wells are said to have produced 49-52-gravity oil from depths averaging about 4800 feet, showing heavy gas flow and producing crude that yielded straight-run gasoline.

Because of the fact that Manchuria has been under the control of Japan for several years, very little information has leaked out concerning oil developments in that area.

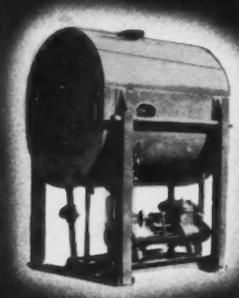
Reports indicate that oil production has been developed at Fuhsin and Pancheng in Jehol province. Production in this sector is said to be from the Jurassic or Cretaceous age.

The oil belt in Formosa is about 220 miles from north to south on the western side of the island. There are two fields, the Shikkoko, 7½ miles southeast of the town of Byoritsu, and the Kinsui, about 5 miles northeast of Byoritsu. The wells are from 650 to 3275 feet in depth. The Kinsui field has been developed as a gas area, and some wells have been drilled to more than 12,000 feet.

MODERN EQUIPMENT FOR OIL OPERATORS

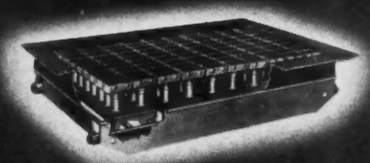
NEW DEAL PIPE CLEANING MACHINES

. . . provide rapid, dependable and efficient operation. Built in three models and several sizes to meet varied requirements.



BANNON FEED WATER HEATERS

are designed to stand up under rough treatment. Easily portable yet ruggedly built, they provide an efficient heating and treating unit for drilling boilers.



BECK "MELLOBLU" GAS BURNER

Increases the capacity of the boiler beyond its normal rating, more complete combustion at low gas pressures.

"TOTCO" DRIFT RECORDER

Provides immediately available permanent records for vertically controlled drilling. Due to simplicity and ease of operation by regular crew, operating efficiency of 98% is obtainable.

LUCEY

OTHER LUCEY EQUIPMENT

Lucey "Slim-Hole" drilling outfits.
Lucey Electric & Diesel Electric Hook-ups
Lucey Boilers & Insulation Casings
Wheland Rotary Drilling Equipment
Chain Belt Company—Sprocket & Roller Chain
Cable Drilling & Fishing Tools

Distributors of
Hughes Rock Bits & Tool Joints
Reed Rock Bits & Tool Joints

"COOPER" DIE-FORMED BASKET

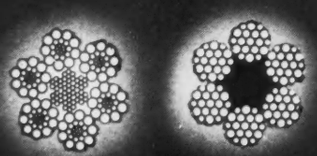
With this tool, it is not necessary to circulate, make hole or rotate in order to pick up rock-bit cones or other junk. The basket fingers scrape the bottom of the hole and catch everything in one grab.

"BUFFALO" SUCKER RODS

"BUFFALO" PULL RODS

"BUFFALO" RODS

Scientific study of 85 years applied to steel analysis, forging operations, threading and machining assure superior performance of Buffalo Rods.

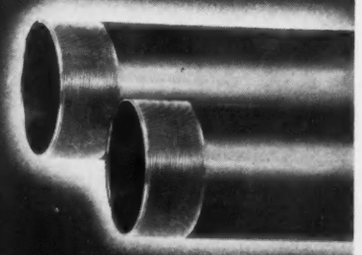


6x19 FLEXIBLE SEALE

6x19 WARRINGTON

UNION WIRE ROPE

Dependable and long lasting. Fabricated in different grades and in all standard sizes.



PITTSBURGH STEEL SEAMLESS TUBULAR PRODUCTS

Casings Tubing
Drill Pipe Boiler Tubes
Line Pipe

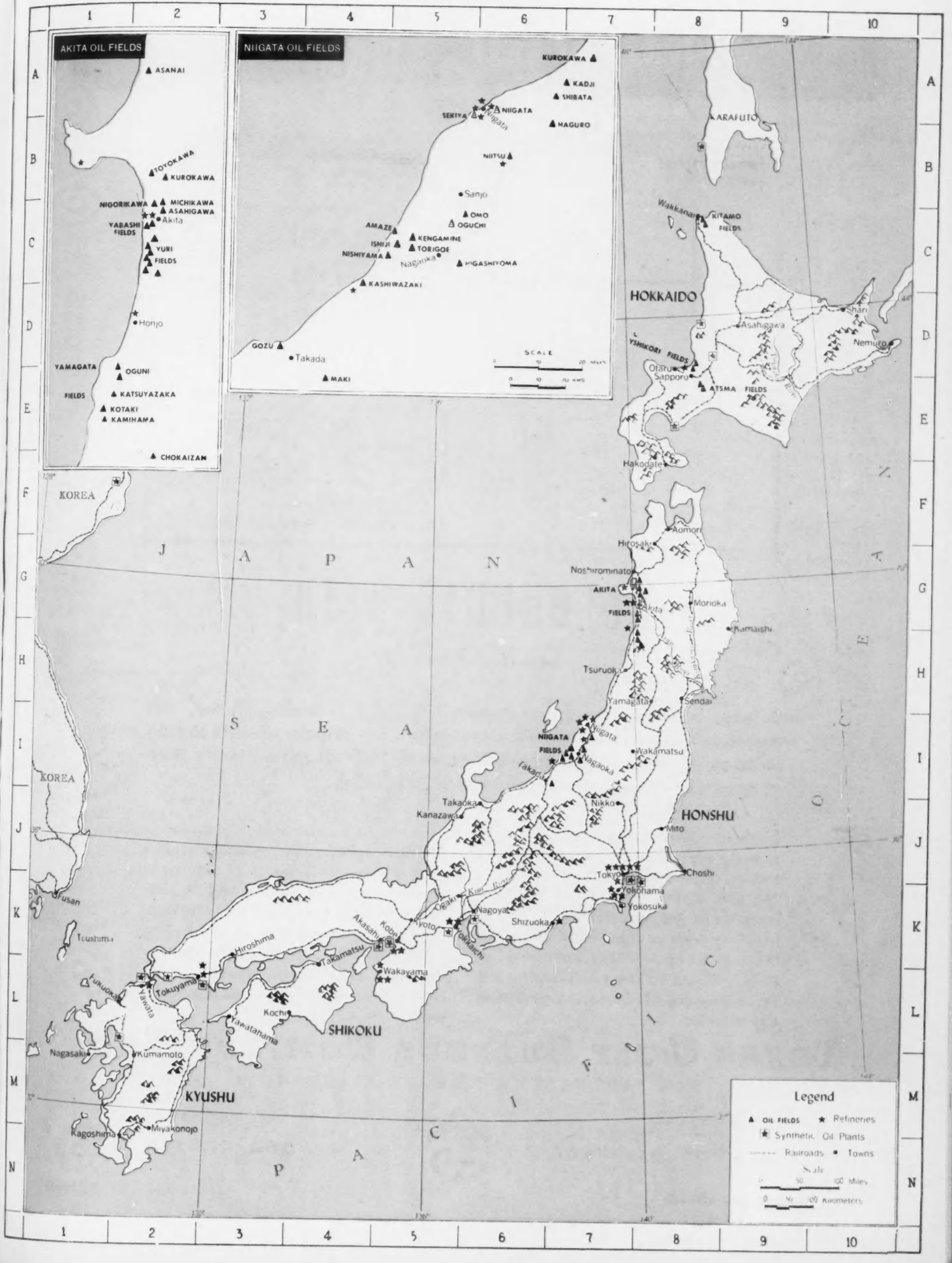
Exclusive Export Distributor

LUCEY EXPORT CORPORATION

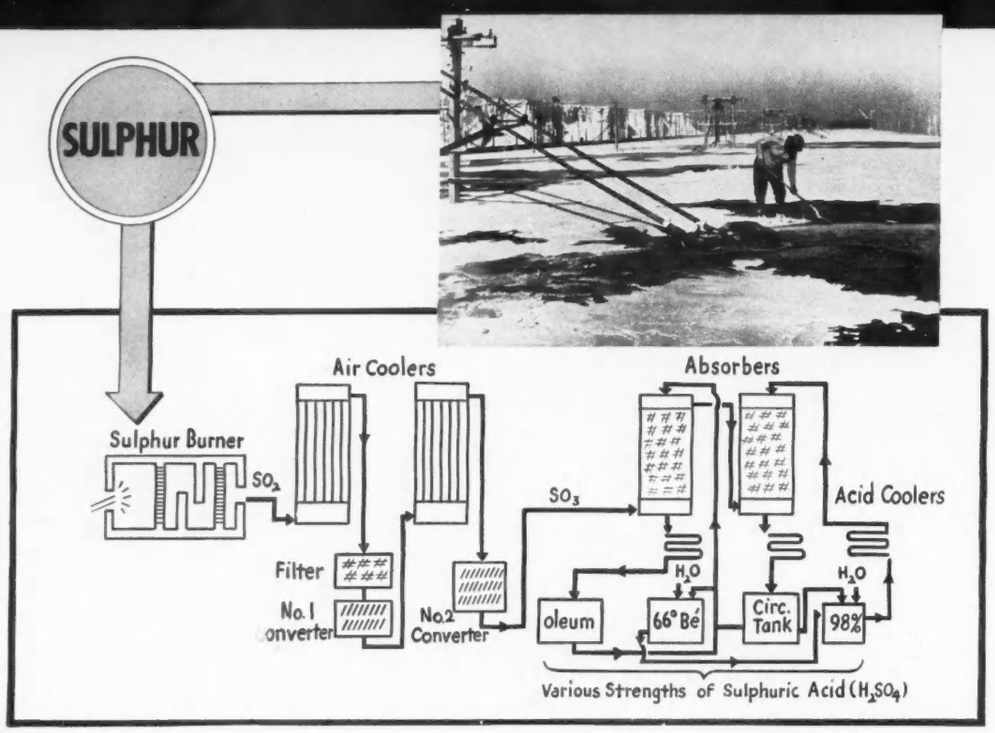
233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England ● 811 Sterling Building, Houston, Texas ● Calle Defensa 320, Buenos Aires, Argentina
San Fernando, Trinidad. B. W. I. ● 615 8th Avenue West, Calgary, Canada

JAPAN


AKITA OIL FIELDS
ASANAI
TOYOKAWA
KUROKAWA
NIGORIKAWA
MICHIKAWA
ASAHIGAWA
Akita
YABASHI FIELDS
YURI FIELDS
Honjo
YAMAGATA FIELDS
OGUNI
KATSUYAZAKA
KOTAKI
KAMIHAMA
CHOKAIZAN
NIIGATA OIL FIELDS
KUROKAWA
KADJI
SHIBATA
SEKIYA
NIIGATA
HAGURO
NIITSU
Sanjo
OMO
OGUCHI
AMAZE
KENGAMINE
ISHIJI
TORIGOE
NISHIYAMA
Nagaoka
HIGASHIYOMA
KASHIWAZAKI
GOZU
Takada
MAKI
SCALE
KARAFUTO
Wakkanai
KITAMO FIELDS
HOKKAIDO
Shari
Asahigawa
Nemuro
YUBIKORI FIELDS
Otaru
Sapporo
ATSUMA FIELDS
Hakodate
KOREA
Aomori
Hirosaki
Noshiromina
AKITA FIELDS
Akita
Morioka
Kamaishi
Tsuruoka
Yamagata
Sendai
NIIGATA FIELDS
Niigata
Wakamatsu
Nagaoka
Takada
Takaoka
Kanazawa
Nikko
HONSHU
Mito
Choshi
Tokyo
Yokohama
Yokosuka
Nagoya
Shizuoka
Ogaki
Kyoto
Kobe
Akashi
Yokkaichi
Hiroshima
Takamatsu
Wakayama
Tokuyama
Fukuoka
Yawata
Kochi
Yawatahama
SHIKOKU
Nagasaki
Kumamoto
KYUSHU
Kagoshima
Miyakonojo
Pusan
Tsushima
KOREA
JAPAN
SEA
PACIFIC OCEAN
Legend
OIL FIELDS
Refineries
Synthetic Oil Plants
Railroads
Towns
Scale
Miles
Kilometers

HOW SULPHUR SERVES INDUSTRY



SULPHURIC ACID

{Contact Process}

Sulphur is burned to sulphur dioxide (SO_2). This is cooled, filtered, and passed to a converter. Here a catalyst causes the sulphur dioxide to take on an atom of oxygen to form sulphur trioxide (SO_3). Sulphur trioxide then compounds with water into sulphuric acid (H_2SO_4).

Sulphuric acid is used in the preparation of so many products—fertilizer, rayon, steel, textiles, etc.—that it has been called the "pig iron" of the chemical industry. Its consumption is the yardstick often used to gauge the volume of industrial activity. It is easily and economically made from Sulphur produced by Texas Gulf because it is 99½% pure and free from arsenic, selenium and tellurium.

Sulphuric acid is of vital importance to American industry. To the acid manufacturer, a dependable source of Sulphur is of equal importance. Texas Gulf Sulphur Company has above ground ready for shipment more than a year's supply for the entire nation. This, together with large underground reserves and efficient mining methods, is assurance of an unfailing supply.

TEXAS GULF SULPHUR COMPANY, INC.

PRODUCERS OF CRUDE SULPHUR

A GOOD NEIGHBOR *A GOOD CITIZEN*

JAPAN

CRUDE OIL PRODUCTION

CURRENT production of the oil fields of Japan is estimated at 4250 barrels daily, or about 1,550,000 barrels annually. Reports issued the latter part of 1945 say there were 4840 wells in Japanese oil fields of which 4805 were pumpers and 35 flowing wells.

Principal producer in Japan is the Teikoku (Imperial) Oil Company which was established in September, 1941, and functioned as a monopoly during the war period. The company now controls about 95 percent of the production.

Maximum production of crude oil in the home islands of Japan was 2,325,000 barrels in 1939 and although Teikoku Oil Company is continuing exploration and drilling at the highest possible level, it is unlikely that future annual output will equal the 1939 record.

Japanese home island oil fields are centered on about a north-south line running from the north tip to southern part of Hokkaido Island, and along the west coast of Honshu Island. There are four principal producing areas in Japan—Hokkaido, Akita, Yamagata, and Niigata. The latter three areas are located in Honshu. The largest of these areas is Akita, which also is a refining center. Japanese crudes are produced with water ranging from 5 percent to 50 percent.

Yamagata District Well and Production Data
(Location on Map Page 283: H-8)

FIELD	Number of Wells			Depth of Wells (Ft.)	Gravity (API)	Crude Oil Production. (Barrels)	
	Producing	Idle	Total			April '44 March '45	April-Sept. 1945
Innai	146	146	292	1965–3280	17.0	142,663	64,417
Katsurazaka	22	12	34	1640–2950	21.4	36,640	17,792
Kotaki	44	2	46	980–1640	16.6	17,824	14,492
Chokaizan	29	....	29	1475–1640	10.0	79,538	13,454
Shonai	12	....	12	655	17.3	1,770	44,516
Total	253	160	413	....	....	278,435	154,608

Akita District Well and Production Data
(Location on Map Page 283: G-8)

FIELD	Date of Discovery	Number of Wells		Depth of Wells (Ft.)	Gravity (API)	Crude Oil Production. (Barrels)	
		Producing	Total			Daily Oct. 1945	Year 1944
Yabase[1]	1935	289	523	490–3280	32.0	1,512	623,000
Asahikawa[2]	1907	163	296	650–1965	19.0	189	66,800
Toyokawa[3]	1912	579	797	490–1640	13.0	189	71,800
Yuri[4]	1918	256	288	328–1640	29.3	75	25,200
Hachimori[5]	1941	14	36	650–2625	17.3	240	25,200

[1] Includes Sotsasahikawa, Koya, Yabase, Omonagawa and Araya. [2] Includes Asahikawa, Nigorikawa and Michiikawa. [3] Includes Toyokawa, Kurokawa and Asanai. [4] Includes Niida, Toyoiwa, Katsurane, Katste, Hanekawa and Wuchimiichikawa. [5] Includes East Hachimori and West Hachimori.

Niigata District Well and Production Data
(Location on Map Page 283 I-7)

FIELD	Number of Wells			Gravity (API)	Crude Oil Production Barrels	
	Producing	Idle	Total		April-Dec., 1944	Jan.-Aug 1945
Nishiyama	455	139	594	28.4	67,162	52,460
Niitsu	925	80	1,005	19.0	109,293	88,191
Higashiyama	500	53	553	27.5	65,776	47,725
Shibata	73	8	81	27.4	....	15,448
Kurokama	....	....	....	23.8	13,253	10,722
Goto	19	9	28	36.8	2,840	1,756
Ohmo	72	3	75	27.7	11,789	9,770
Torigae	71	....	71	....	2,704	1,143
Maki	160	10	170	39.8	4,372	3,231
Kuwasone	1	....	1	....	....	13
Total	2,276	302	2,578	....	277,189	230,459

REFINERIES

Japan's crude oil refining capacity exceeds considerably the production from oil fields on the home islands.

There are three refinery operating companies in Japan—Nippon Oil Company, Showa Oil Company, and Nippon Mining Company. The war caused many small plants in Japan (about 20 in number) to be consolidated or eliminated entirely. These small plants, located in the southern part of Honshu Island, depended entirely upon imported crude.

Just before the close of the war there were 8 principal Japanese crude refineries. The crude throughput of these plants was about 5 million barrels a year up to the close of the war. However, a large modern plant of Nippon Oil Company at Akita was destroyed by an air raid in August, 1945, reducing the annual capacity of Japan's refineries to about 3,220,000 barrels.

Most of Japan's existing refinery equipment now in service is very old and out of date.

In addition to the crude oil refineries there were about 14 synthetic oil plants in Japan operating during the war. One of the plants was located at Karafuto, three on Hokkaido Island, and 10 on Honshu Island.

Principal Crude Oil Refineries of Japan[2]

Operating Company	Location of Plant	Daily Capacity (Barrels)
Nippon Oil Company	Kashiwazaki	1400
Nippon Oil Company	Niigata	2500
Nippon Oil Company	Hokkaido (Garugawa)	635
Showa Oil Company	Niigata (2 plants)	2335
Showa Oil Company	Hirasawa (Akita)	420
Nippon Mining Company	Funakawa (Akita)	1665
Nippon Oil Company[1]	Akita	4900

[1] Destroyed by air raid. [2] Does not include many small plants.

Hokkaido District Well and Production Data

FIELD	Location on Map Page 283	Date of Discovery	Number of Wells[1]	Gravity (API)	Depth of Wells (Ft.)	ANNUAL PRODUCTION IN BARRELS				
						1941	1942	1943	1944	1945[1]
Atsma Fields:	E-8									
Fureoi		1935	156	25.3	110– 941	15,017	14,355	13,268	10,932	10,514
Karumai		1936	98	25.9	392– 630	9,959	10,381	8,402	5,987	4,302
Yshikori Fields:	D-8									
Ishikari		1903	161	59.7	303–1500	17,763	16,407	15,911	15,402	10,683
Atsuta		1929	8	59.7	150–1105	2,248	1,768	1,668	1,451	972
Kitamo Fields:	C-8									
Koetoi		1921	7	39.0	850–1235	5,796	3,346	3,340	2,408	1,678
Masuphoro		1923	3	30.2	376– 413	147	186	1,155	554	361
Menashi		1915	9	43.2	540– 750	2,102	679	364	552	728
Kitatoyotomi		1938	2	24.6	333– 338	159	406	635	434	156
Total	....	....	444	....	.....	53,188	47,528	44,743	37,720	29,394

[1] Data on 1945 production and number of wells as of September 30, 1945.

A WELL-ROUNDED LINE...

at the sign of the Green Triangle

The Continental organization was founded on the precepts that its growth depended upon giving the industry a well-rounded line of *good* equipment . . . and dependable *service*. This policy has justified itself as evidenced by Continental's steady —yet unhurried—expansion. Now "The Green Triangle" is a familiar—and looked for—sign throughout the oil world.

THE CONTINENTAL SUPPLY COMPANY...*General Offices:* Dallas, Texas

EXPORT DIVISION, 30 Rockefeller Plaza, New York, N. Y.

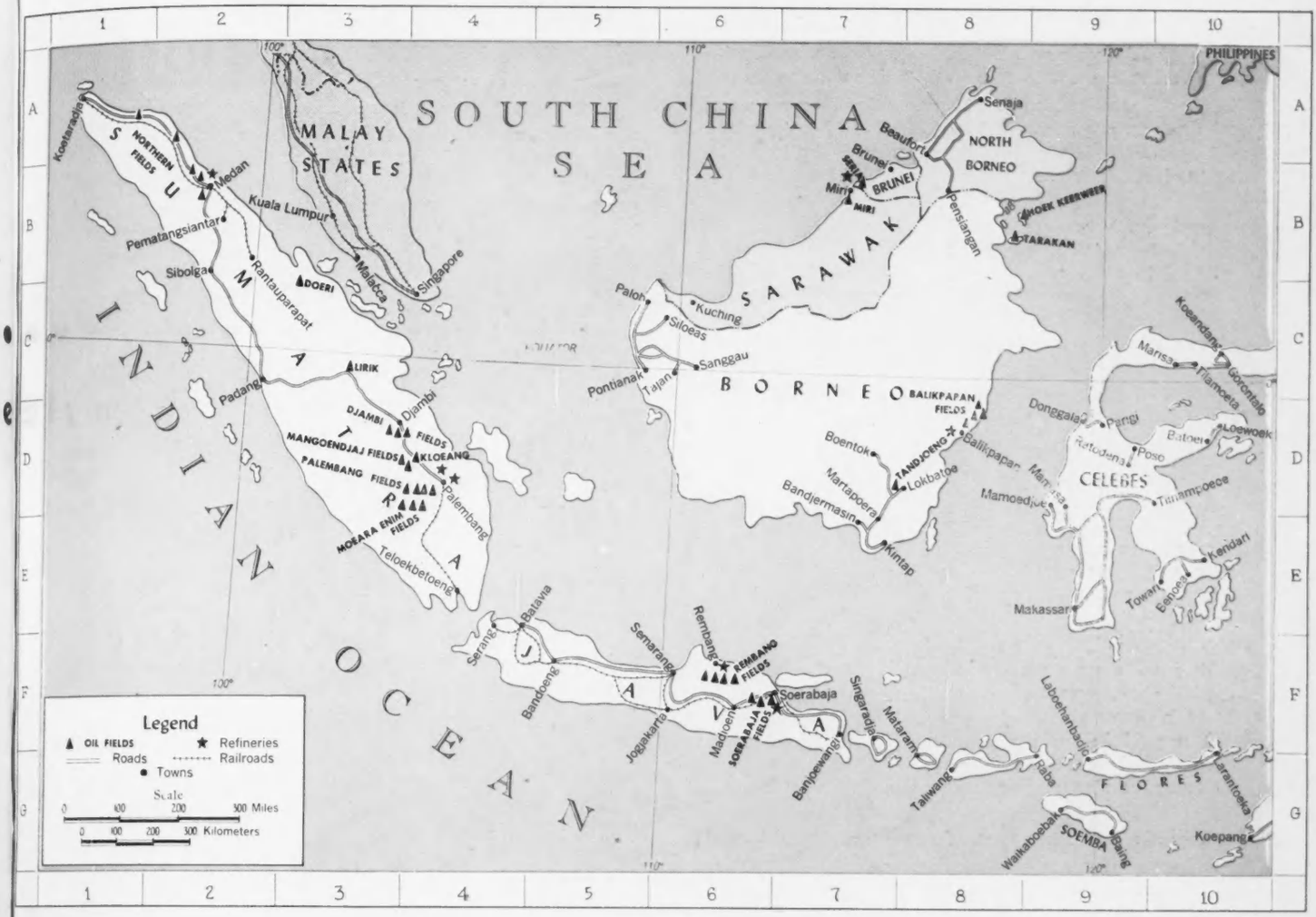
Representatives:

▲ Buenos Aires, ARGENTINA ▲ LaPaz, BOLIVIA ▲ Rio De Janeiro, BRAZIL ▲ Santiago, CHILE
▲ Barranquilla, COLOMBIA ▲ London, ENGLAND ▲ Batavia, JAVA ▲ Mexico City, MEXICO
▲ Lima, PERU ▲ Port of Spain, TRINIDAD ▲ Maracaibo, VENEZUELA

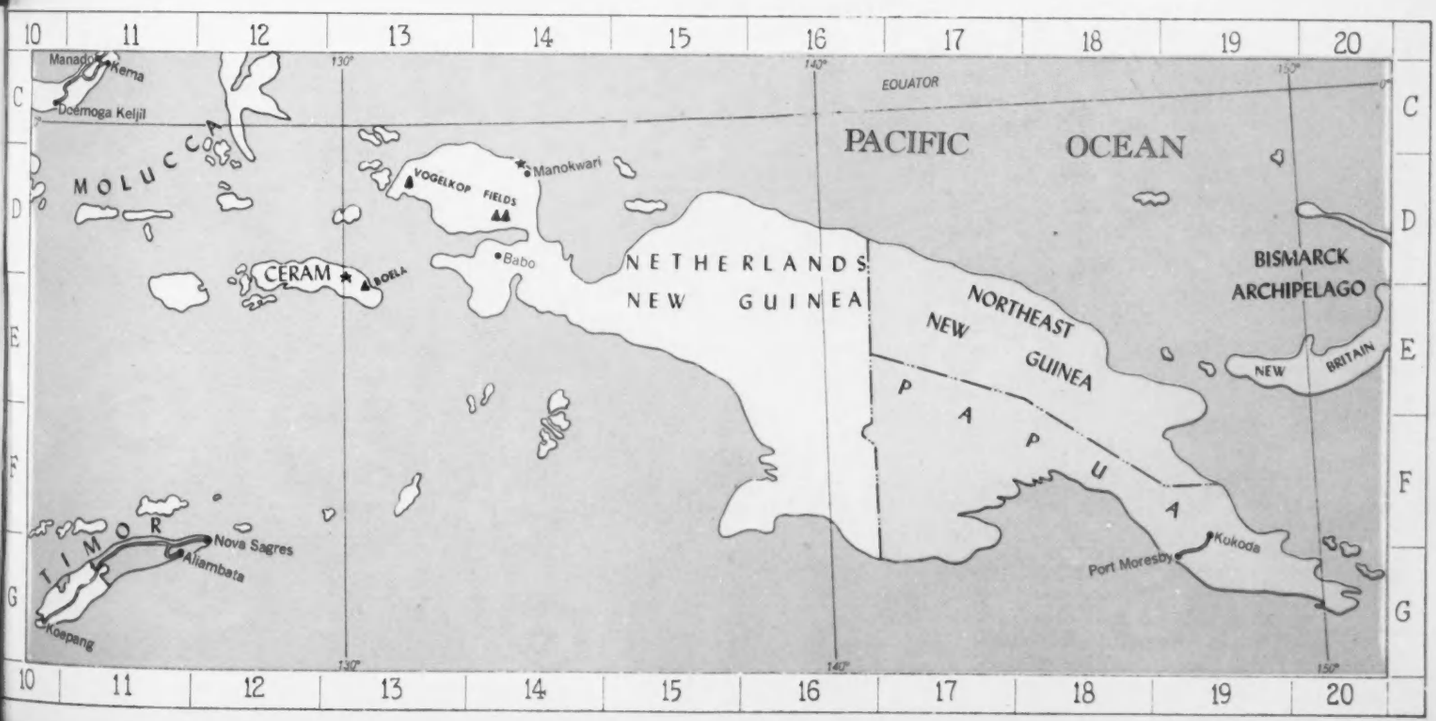
CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

EAST INDIES—Sumatra, Java, Borneo



Ceram, New Guinea



Look to

LARKIN

FOR FUTURE CONTRIBUTIONS TO CEMENTING EQUIPMENT PERFECTION

Larkin was the first manufacturer of cementing equipment . . .

. . . to use concrete for shoe guides instead of metal

. . . to use a plastic (Bakelite) as a shoe guide

. . . to employ the "Perfect Circle" cementing technique

. . . to successfully prevent the downward movement of cement below the shoe during and after the cementing operation . . . "Cementrol Principle."

Our Policy

Through continuous research and field tests, we have continued to improve the Larkin Products we have offered the Oil Industry for more than 40 years. Now, with greatly expanded facilities in our St. Louis plant, we plan to increase our program of new and continuously improved products, based on extensive development, research and proven design. We have never sacrificed quality materials and skilled workmanship for the sake of price. We never will. We will continue to offer the Industry the best possible products for the job so that the Oil Industry may always . . . *Look to Larkin for future contributions to cementing equipment perfection.*

LARKIN PACKER CO., INC.
ST. LOUIS, MO.

WAREHOUSES: Tulsa, Houston, Great Bend, Wichita Falls, Odessa, Shreveport, Corpus Christi.
WEST COAST: Howard Supply Co.
ROCKY MOUNTAIN: E. C. Dilgarde Co.
EXPORT: 19 Rector St., New York 6

NETHERLANDS EAST INDIES

GENERAL DEVELOPMENTS

JAPANESE seizure of the East Indies in early 1942 terminated an exploratory program which was conducted with promising results in 1941.

The seizure of the oil fields and refineries also halted the flow of approximately 165,000 barrels of crude oil daily from about 3300 producing wells in Java, Sumatra, Borneo, New Guinea, Ceram and Brunei. Adhering to the "scorched earth" policy, the oil fields and refineries of the East Indies were blasted and left burning by the retreating Dutch and British in the spring of 1942.

The East Indies oil area received its second "scorched earth" destruction when the Japanese gave way to the re-occupation forces of the Allied Nations in 1945. An inspection of the oil fields and installations by their prewar owners found some of the properties in surprisingly good condition with some of the wells ready to go on production immediately. However, the refineries were damaged badly and it will be some time before the prewar refining capacity of East Indian plants is attained.

Prior to Japanese occupation, the oil fields of the East Indies had reached an annual production of approximately 59 million barrels with Sumatra being the largest producing area. The refining capacity was about 200,000 barrels daily.

British and Dutch interests, represented by the Royal Dutch-Shell group, Socony-Vacuum Oil Company and Standard Oil Company (New Jersey) are the principal operators in the South Pacific.

SUMATRA

The most important oil fields of the Netherlands East Indies are located in Sumatra. In the 15 years prior to the war, production in Sumatra had been steadily increased and in 1940 it totaled about 39 million barrels, equivalent to approximately 65 percent of the production of the East Indies. More than one half the refining capacity also is located on the island of Sumatra. However, the refineries will have to be rebuilt following termination of war.

The oil fields of Sumatra are divided into two principal regions—northern Sumatra north of Medan and southern Sumatra centering about Palembang. The two regions are separated by hundreds of miles of jungle in which geological work has been conducted and some small production obtained. Operators on Sumatra are Bataafsche Nederlandsche Maatschappij (Shell) and Nederlandsche Koloniale Petroleum Maatschappij (Socony and Standard of New Jersey).

The oil produced in Sumatra is a light, paraffin-base oil. the average gravity exceeds 40° API, and wax content is large.

Northern Sumatra fields include Pase, Perlak, Rantau and Telaga Said and are north of Medan. First production was obtained by BPM (Shell) near Pangkalan Brandan, 60 miles north of Medan. Shell's headquarters and a small refinery are also located at Pangkalan Brandan.

The major producing field in the northern area is *Rantau*, 40 miles north of Pangkalan Brandan. Rantau is a long, narrow anticlinal fold lying at an angle of about 45 degrees to the mountain axis of the island. More than 50 wells have been drilled in the field, all of which produced by natural flow or gas lift prior to the war. The oil is light amber in color, and the gravity is about 50° API. An extension of the field, or possibly another fold on the same axis, 10 miles to the southeast, was drilled some years ago but produced gas and only little oil. Production at Rantau is obtained from two groups of sands which are produced by twin wells. The depth of the wells ranges from 2500 feet to 3000 feet depending upon position on the structure. Rantau is a water-drive field. The flowing pressures (prior to the war) was 350 to 500 pounds per square inch and were kept in balance throughout the field.

At *Pase*, NKPM (Socony-Standard of New Jersey) has an old field situated in a rolling virgin jungle at an elevation of 100 feet. Only a few wells have been drilled with the production coming from about 2000 feet. Water and sand troubles are prevalent.

Production at *Perlak* and *Telaga Said* is small. In all, the Medan area has about 175 wells with a prewar production of about 20,000 barrels daily.

The fields of southern Sumatra are centered around the town of Palembang. These areas include *Palembang, Moeara,*

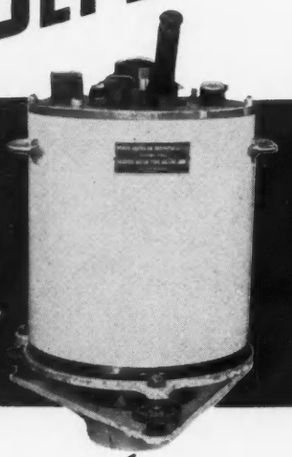
Engineering and Geological Data on East Indies Oil Fields

FIELD: ISLAND	Location on Map	Range of Gravity of Oil (API)	PRODUCING FORMATION						
			Name	Kind	Age	Depths of Wells (Ft.) Minimum Top Pay	Depths of Wells (Ft.) Maximum Total Depth	Average Thickness of Pay (Feet)	Type Structure
Sumatra:	Page 291								
Pase	B-2	50	.....	Shaly snads	Pli. Mio.	....	2000	80–250	Anticline
Pangkalan Fields (P. Soesoe, Rantau, Serangdjaja, Perlak)	C-3	48 to 55.5	.....	Shaly sands	Pli. Mio.	350	4200	10–1000	Anticline faulting
Mangoendjaja Fields (Soeban Boeroeng, Babat, Karang, Ringin)	I, J-8	23.6 to 27.7	Palembang Telissa	Shaly sands	Miocene	430	2000	....	Anricline faulting
Palembang Fields (Talang Akar, Djirak, Benakat, Limau, Talang, Djimar)	J-8	43 to 45.4	.....	Shaly sands	Pli. Mio.	140	2600	....	Anticline faulting
Moeara Enim Fields (Soeban-Djerigi, Tandjoeng-Loeutar)	K-8	45 to 55	Palembang Telsisa	Shaly Sands	Pli. Mio.	350	4500	....	Anticline faulting
Djambi Fields (Kenali Asam, Tempino, Badjoebang, Betoeng)	I-8	49	Palembang Telissa	Sandy shale	Pli. Mio.	2650	2974	....	Anticline faulting
Kloeang	J-8	43.2	Palembang Telissa	Sandy shale	Miocene	500	2600	....	Anticline faulting
Java	Page 299								
Rembang Fields (Kawengan, Ledok, Nglobo)	E-6	31.3 to 46	Globigerina L.Rembang	Shaly sands	Pli. Mio	1900	3000	....	Anticline faulting
Soerabaja Fields (Kroeka)	E-7	25.7	Globigerina	Shaly sands	Pli. Mio.	164	1400	....	Anticline faulting
Ceram	Page 299								
Boela	D-6	22.5	Boela	Sand shale	Pli. Tri.	240 to 1000	260 to 1020	....	Faulted Anticline
New Guinea	Page 299								
Klamono	B-7	18.8	.....	Lime	Miocene	390	....	....	Anticline
Wasian-Mogoi	C-9	47.6	.....	Lime	Miocene	1870	3225	....	Anticline
Sarawak	Page 287								
Miri	B-7	17.9 to 47.4	Miri	Sand	Miocene	130 to 5564	340 to 5790	....	Faulted Anticline
Brunei	Page 287								
Seria	B-7	18.1 to 32	Seria Miri	Sand shale	Miocene	500 to 2500	2000-3300	....	Faulted Anticline
Borneo	Page 287								
Samarinda Fields (Sambodja, Sanga Sanga, Anggana)	....	17.4 to 33	.....	Sandy shales	Pli. Mio.	165	2500	....	Faulted Anticline
Tarakan	B-8	18.2	Tarakan	Sand	Pli. Mio.	210–2600	230–2620	....	Dome. Anticline with faulting

PORTABLE ACCURATE DEPENDABLE

ON LOCATION...

with a North American Gravity Meter



Unless your field parties are using the North American Gravity Meter they've never experienced such ease and simplicity, such speed and accuracy in making gravity surveys. In rough country or on level terrain, in swamp land or water locations, the light weight compact design of the Meter enables the party to move freely over the territory . . . set-up and obtain a reading in one minute after arrival at the desired location.

The Meter, weighing only 28 pounds, can be carried by back pack to most remote locations . . . mounted in a standard sedan or "Jeep" it can be driven to locations accessible by car and reading made by extending the tripod through the car floor . . . it can be carried in small boat or canoe over deep swamps and water where readings are made by setting up the tripod. Extra long tripods make readings simple and easy in deepest water.

The North American Gravity Meter has a sensitivity of .01 miligal and its accuracy has been proved by readings made as much as a year later on the same location. Its dependability has been demonstrated by long periods of field operation without adjustments or servicing being necessary.

The North American Gravity Meter is available for sale or lease, with or without our own field parties, for both foreign and domestic gravity surveying. If you are interested in speedier, more economical gravity surveys, you are invited to write us.

NORTH AMERICAN GEOPHYSICAL COMPANY

GRAVITY-MAGNETIC-SEISMIC SURVEYS *GEOPHYSICAL APPARATUS*

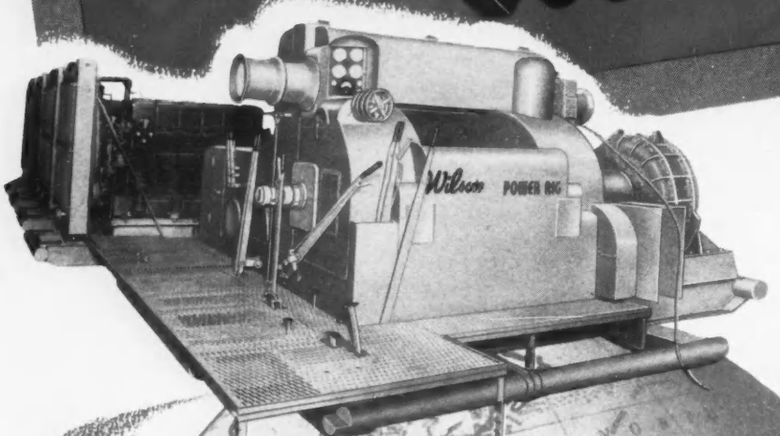
636 BANKERS MORTGAGE BLDG. — CHARTER 4-3523

HOUSTON 2, TEXAS

SUMATRA

SOUTH CHINA SEA
INDIAN OCEAN
MALAY STATES
STRAIT OF MALACCA
RIOUW ARCHIPEL
LINGGA ARCHIPEL
BANGKA
BELITONG
DJAWA
Songkhla
Pattani
Satun
Kangar
Kota Bharu
Kuala Krai
Kuala Lipis
Tronoh
Telok
Batang Berjuntai
Kuala Lumpur
Port Swettenham
Kuala Pilah
Chukai
Kuantan
Pekan
Mersing
Johore Bahru
Singapore
Malacca
Laoet Tawar
PASE
PERLAK
RANTAU
TELAGA SAID
Medan
Koetatjane
Koeala
Arnhemia
Deliroea
Tandjoengbalai
Kalakepen
Pematangsiantar
Rantauparapat
SIMEULOEE
NIAS
Sibolga
DOERI
Natal
Pakanbaroe
EQUATOR
BATOE
Limbang
Soengailimau
Sawahlonto
LIRIK
Rengat
Padang
SIBEROET
MENTAWAI ISLANDS
Djambi
DJAMBI FIELDS
Muntok
Belinjoe
KLOEANG
MANGOENDJAJA FIELDS
Sekajoe
Pladjoe
Palembang
PALEMBANG FIELDS
MOESARA ENIM FIELDS
Toboali
Menggala
Bintoehan
Kroë
Kotaagoeng
Teloekbetoeng
Kalianda
Merak
Serang
Batavia
Anjer Lor
Laboehan
Legend
OIL FIELDS
Refineries
Roads
Railroads
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers

You're sitting on top of the drilling world with a Wilson RIG

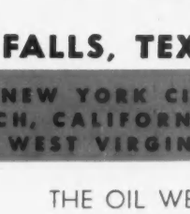


SUPER TITAN
The newest member of this famous line of rigs. Multiple hook-up and compounding of engines means enough smooth, dependable power to take you down to 18,000 ft.

In every active oil field . . . in every part of the world . . . Wilson Rigs are on the job. It's true now and was true before the war. This world-wide popularity of Wilson Rigs is due to their outstanding superiority. They are engineered to do a better job . . . easy to operate . . . easy to repair . . . plenty of power and speed in coming out of the hole . . . enough power to drill in any formation and to any depth . . . and made to withstand the most gruelling treatment. There's a Wilson model for every drilling depth . . . from shallow wells to the untapped oil pools lying 18,000 feet down. Before buying your next rig, investigate the Wilson line. Our Rigs will do a better drilling job for you!

WILSON RIGS AND WINCHES
may be purchased from the following
BOVAIRD SUPPLY CO.
JONES & LAUGHLIN SUPPLY CO.
THE INDUSTRIAL SUPPLY CO.
MID-CONTINENT SUPPLY CO.
and other recognized supply companies.

THE PACE-SETTING Rig



WILSON MANUFACTURING CO., INC. ● WICHITA FALLS, TEXAS

EXPORT REPRESENTATIVE • GUY E. DANIELS • 30 ROCKEFELLER PLAZA • NEW YORK CITY
PACIFIC COAST DISTRIBUTOR • H & B SALES CO., LTD. • LONG BEACH, CALIFORNIA
UNITED PIPE & SUPPLY CORP. • 1542 HANSFORD ST. • CHARLESTON, WEST VIRGINIA

NETHERLANDS EAST INDIES—Continued

Enin, Mangoendjaja, and *Kloeang.* To the north is the *Djambi* field. The oil pools lie in parallel ridges trending northwest-southeast at the north but more nearly east-west toward the south. The folds are narrow domal areas on closed anticlines, locally asymetrical, the steeper dips being on the western side toward the mountains. The producing strata are sand lenses in the Middle Palembang formation of Lower Pliocene and Miocene ages. In this region there are about 1400 wells with a prewar production of about 92,500 barrels daily. Both Shell and Standard have headquarters on the opposite side of the river Moesi from Palembang.

BORNEO

The oil fields and refineries of both Dutch Borneo and the British protectorates of Borneo, including Sarawak, Brunei and North Borneo, suffered considerably during the war. Prior to the war there were about 1500 producing wells on all of Borneo with a daily average production of approximately 50,000 barrels.

Producing areas of Dutch Borneo include Tarakan, Hoek Keerweer, Tandjoeng, and the Samarinda fields (Sanga Sanga, Anggana and Sambodja).

Possibilities that the Borneo oil fields may have been so depleted by the Japanese during their three years of occupation as never to return to prewar production level have been raised in oil circles. However, the first shipment of crude from Borneo fields reached Australia during March, 1946.

The fields in the *Samarinda* area lying in the southeast part of Dutch Borneo are situated along a narrow folded ridge. This district, of which Sanga Sanga is the largest, yields most of the oil produced in Borneo.

The *Tarakan* field is located in the northeast part of Dutch Borneo on an island of that name. This field covers approximately 2400 acres and produces from the Tarakan sand in the Pliocene and Miocene ages. The field has a shallow sand at about 130 feet and a deep zone at 5565 feet.

The *Miri* district, along the northwest side of the island of Borneo, is the principal productive area in Sarawak. Oil is obtained from sand lenses in the lower Miocene.

Northeast of Miri in Brunei lies the *Seria* field which produces from two zones in the Miocene with the tops of the sand ranging from 500 to 2500 feet.

JAVA

The oil production in Java is in areas of *Rembang* (Kawengan, Ledok and Eglobo), and *Soerabaja* (Kroeka) on the eastern portion of the island. As on the other islands of the East Indies, the fields are operated largely by Shell, Socony-Vacuum and Standard of New Jersey. Prior to the war, the Java had about 350 producing wells with a daily average production of about 18,000 barrels.

The fields of East Java underlie an area approximately 75 miles long and 25 miles wide. The oil is obtained from sand lenses in the Middle and Lower Rambang formations of the Lower Miocene age. The structures are sharply folded and faulted anticlines.

Oil was first produced from the *Rembang* fields around Tjepoe about 60 years ago. Of the several fields in this area, Kawengan is the most important. Koloniale has a small field near Batavia but it is unimportant.

Standard Oil Company of California drilled an 8170-foot dry hole in the western part of the island near Batavia in 1938.

Prior to the war, most of the wells on Java produced by natural flow or by gas lift. The wells are about 2700 to 3000 feet deep. In all, there are 37 anticlines in Java of which about 25 have been productive.

CERAM

Ceram's production, normally about 2000 barrels daily, is obtained from the *Boela* field and showed a steady increase from 1934 until the war. The field was discovered by BPM (Shell) and first drilling was as early as 1897. The structure is a small dome with about 50 producing wells. Oil is obtained from soft sands and shaly sands in the Pliocene-Triassic unconformity found at shallow depths. The oil is low gravity with an asphalt base.

NEW GUINEA

Oil explorations on New Guinea, started in earnest in 1936 but were interrupted by war. As yet, production is unimportant.

Exploratory operations have been carried on by several companies including Shell, Standard-Vacuum, and Standard of California and The Texas Company operating jointly as the Nederlandsche Nieuaw Guinee Petroleum Maatschappij (NNGPM). All installations of the latter company were destroyed by the Dutch in 1942.

Large concessions have been explored throughout the archipelago by private companies and by government agencies. Typical of the latter is the Australian government's oil search in Papau, southeastern section of New Guinea.

The principal oil areas of New Guinea include *Klamono, Mogoi* and *Wasian.* Earlier exploration was conducted on the *Hohoro* dome on Vailala River, Papua, by New Guinea Oil Company; at *Matapau* and *Sepik* by Mandated Development Company, and in the *Upoia* sector on Vailala River. Some production was obtained in wells drilled by the Mandated Development Company at Sepik in 1924-26.

With government restrictions on the search for oil in New Guinea lifted, Australian Petroleum Company is preparing to proceed with geological and geophysical work. A deep test also is projected. The company had reached 5000 feet when operations were halted in February, 1942. Drilling equipment and machinery are said to have been preserved and will be moved back to the location.

New Guinea Gold & Petroleum Development Company is reported to have applied for permits from the Australian government to conduct oil exploration in New Guinea.

Data on Refineries of East Indies

Company, Headquarters Address	Location of Plant	Crude Charging Capacity (Barrels Daily)	Cracking Capacity (Barrels Daily)	Type of Refinery
Sumatra				
de Bataafsche Pet. Mij. (Shell) Carl van Bijlandtlaan 30, The Hague	Pangkalan Brandon	23,000	None	Skimming
	Pladjoe, Palembang	50,000	2,500	S-C-Lube
Nederlandsche Koloniale Pet. Mij., Gebouw Petrolea, Box109, Hague	Palembang	45,000	18,000	Complete
Borneo				
de Bataafsche Pet. Maatschappij (Shell), Carl van Bijlandtlaan 30, The Hague	Balikapan	41,250	7,400	Complete
Sarawak				
Sarawak Oilfields Ltd., (Shell)	Lutong	20,000	None	Skim-Lube
Java				
N. V. de Bataafsche Pet. Maatschappij (Shell), Carl van Bijlandtlaan 30, The Hague	Tjepoe	15,000	600	Skim-Crk
	Wonokromo	2,500	None	Skimming
Nederlandsche Koloniale Pet. Mij. (Standard-Vacuum Gebouw Petrolea, Box 109, The Hague	Kapoehn	500	None	Skimming

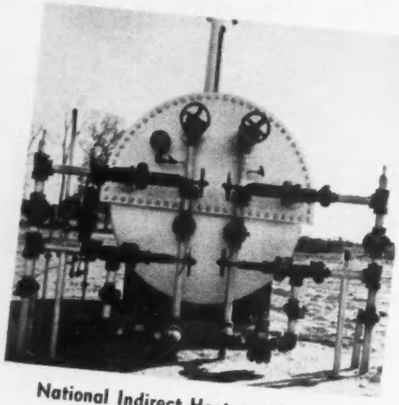
Note—Operating Status—Unknown.

NATIONAL IS INTERNATIONAL

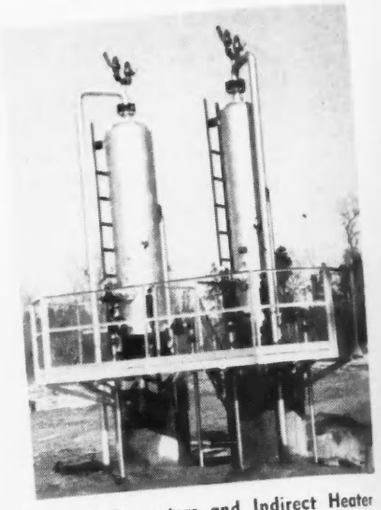
HEADQUARTERS

for

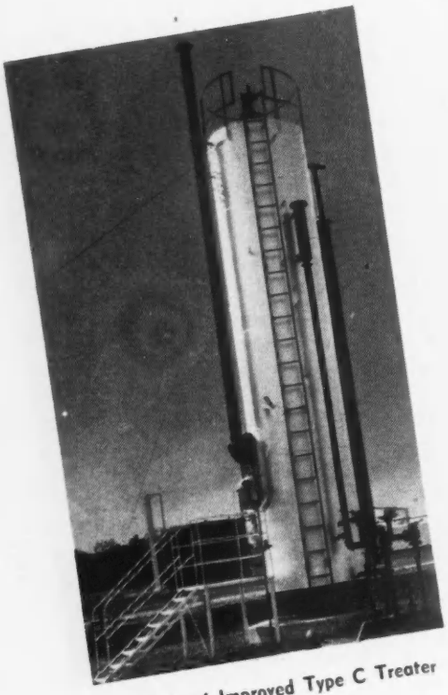
It's a National



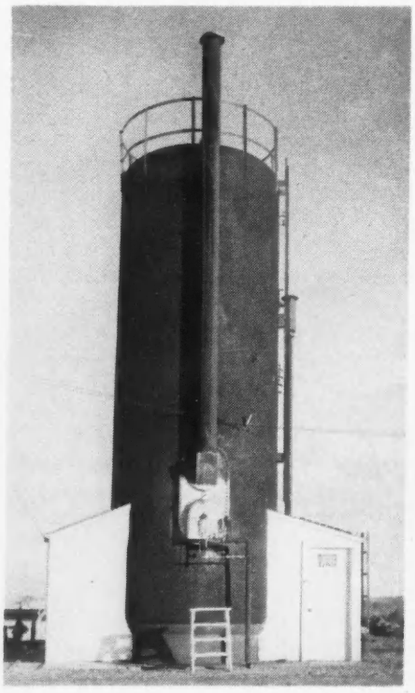
National Indirect Heater with Dual Completion Hook-Up



National Separators and Indirect Heater Installations in Swampy Country



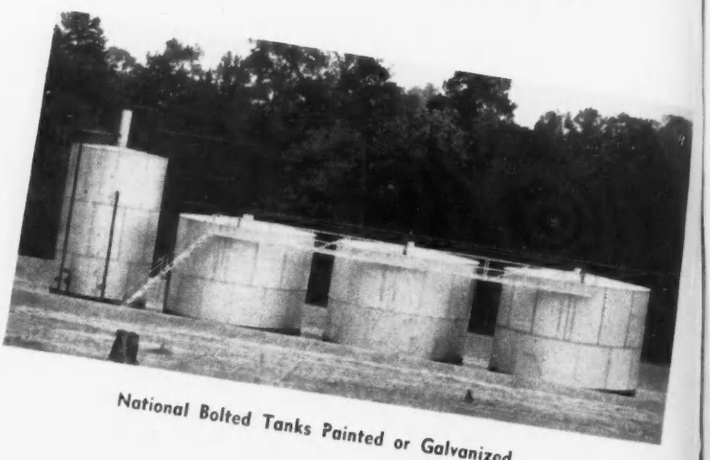
National Improved Type C Treater



National "XYCP" Treater, Insulated—for Low Gravity Oil Treating—in Wyoming

National Indirect High Pressure Heaters for Kobe Pumping Units

National Separator, Tower, Treater and Tank Battery



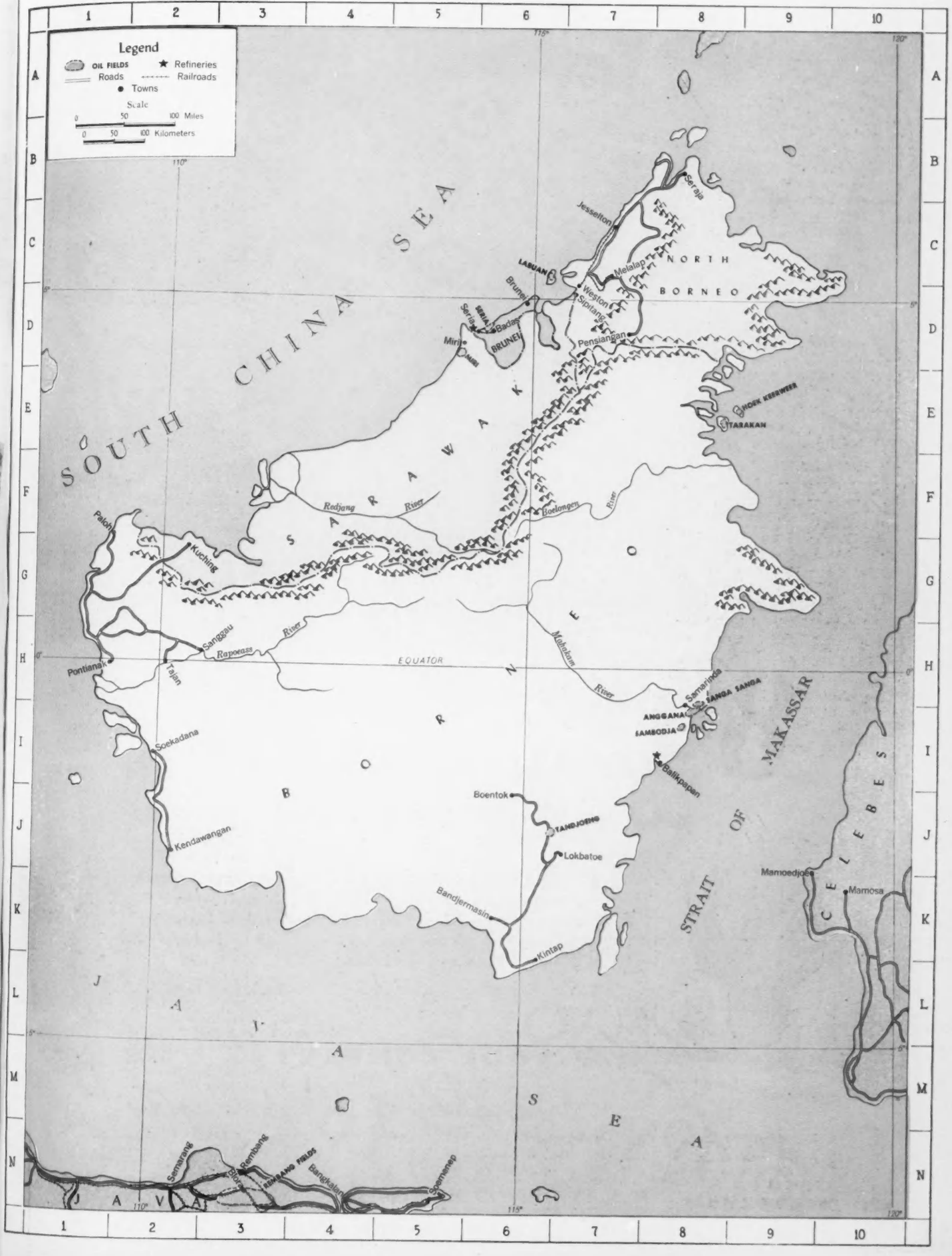
National Bolted Tanks Painted or Galvanized

NATIONAL TANK COMPANY

TULSA, OKLAHOMA.

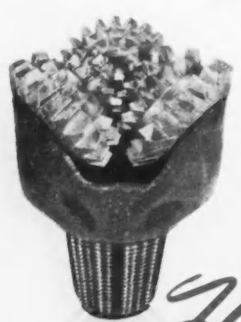
National Supply Export Corp., 30 Rockefeller Plaza, New York, N. Y.

BORNEO


Legend
OIL FIELDS
Refineries
Roads
Railroads
Towns
Scale
0 50 100 Miles
0 50 100 Kilometers
SOUTH CHINA SEA
SARAWAK
BORNEO
NORTH BORNEO
BRUNEI
LABUAN
Jesselton
Seraja
Melalap
Weston
Sipitang
Brunei
Seria
Badas
Miri
Pensiangan
TARAKAN
Redjang River
Boelongan River
Kuching
Paloh
Sanggau
Rapoeasa River
Pontianak
Tajan
EQUATOR
Soekadana
Kendawangan
Boentok
TANDJONG
Lokbatoe
Bandjermasin
Kintap
Malahoom River
Samarinda
SANGA SANGA
ANGGANA
LAMBODJA
Balikpapan
STRAIT OF MAKASSAR
CELEBES
Mamoedjoe
Mamosa
JAVA SEA
Semarang
Rembang
SEMARANG FIELDS
Bangkalan
Soemanep

86% ...OF ALL THE ROCK BITS

used in its development were Hughes



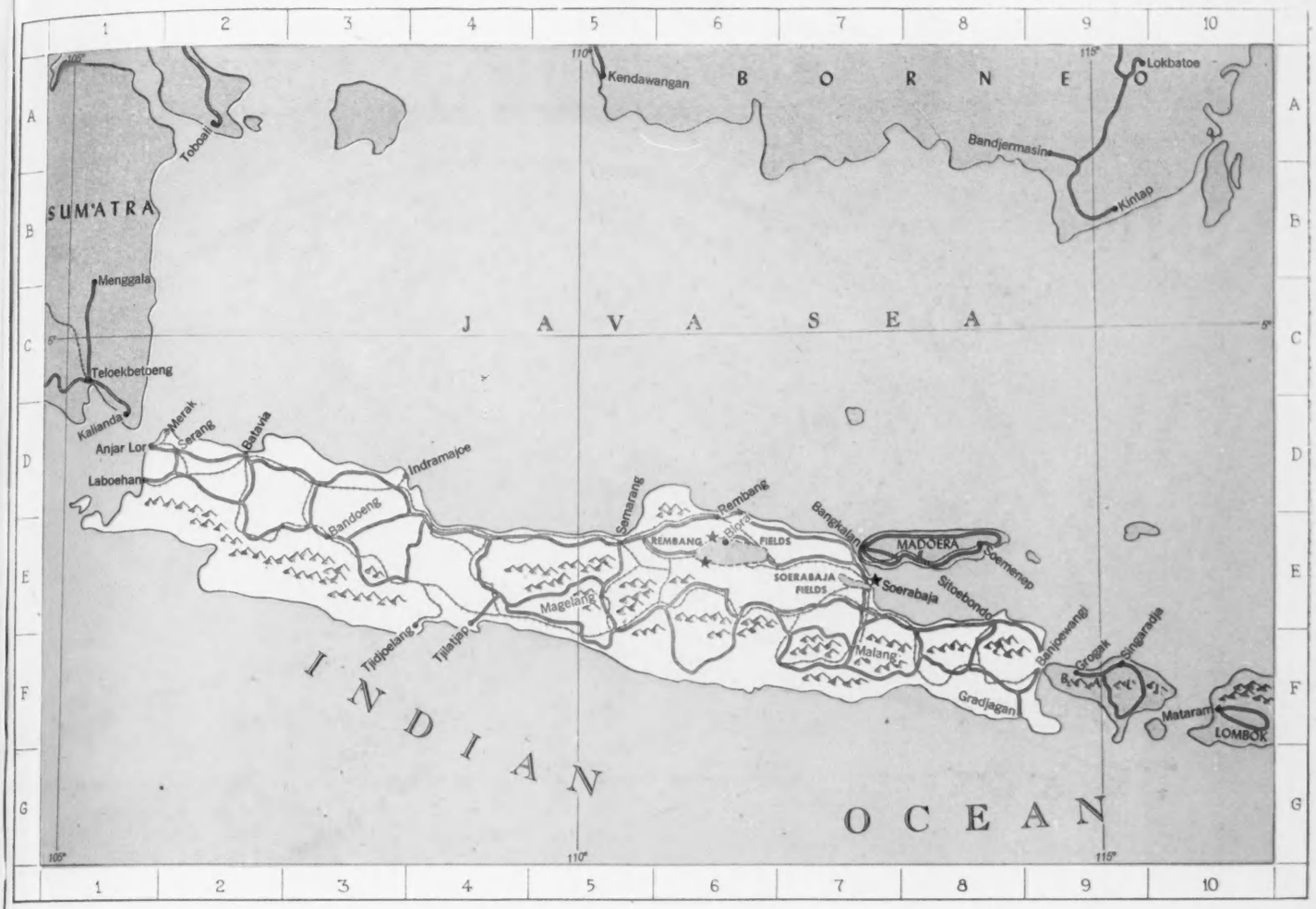
IN the north extension of Hildreth Pool, Stoneburg, Montague County, Texas, wells are completed to the Mississippi Conglomerate at 6200 feet in thirty days drilling time, using approximately 25 bits per well. Actual records of bits used show that Hughes leads the field by a ratio of six to one. There must be a reason.

With Drilling Superintendents, the choice is Hughes six to one . . . 86% of all the rock bits used.

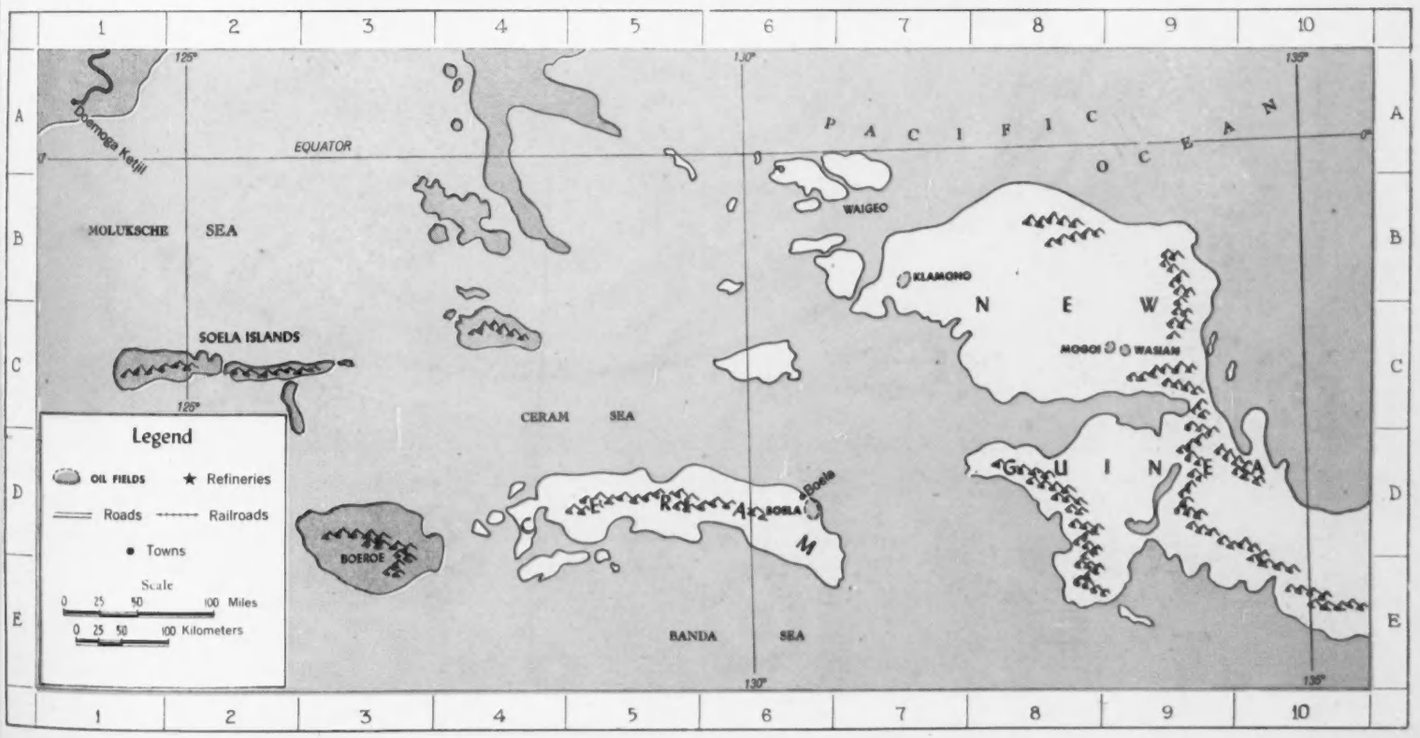
Hughes **TOOL COMPANY** HOUSTON, TEXAS

Standard of the Industry

JAVA



CERAM—NEW GUINEA



EXPLORATION ANM

. . . A Map is Only as Accurate

There are obvious errors in this map drawn by Homann about 1750. A cartographer's accuracy is limited by the reliability of his exploration data.

"GSI" on a structure map or survey report guarantees the worth of the explorations behind it. No name is more favorably known among those who search for oil. Call in GSI.

MAP MAKING

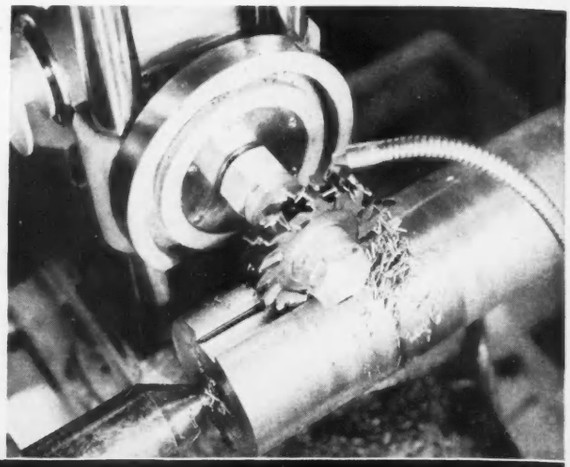
...ates the Data Behind It!

"Basis Geographiae Recentioris Astronomica," by Homann, circa 1750

GEOPHYSICAL SERVICE INC.

DALLAS, TEXAS

(Right) A close-up view of the Master Lathe Converter Milling a 1" x ½" keyway in 4½" diameter shaft on a lathe.



CAN YOU MILL A 2½-IN. WIDE KEYWAY ON BOTH ENDS OF A 10-IN. DIAMETER SHAFT, 20 FT. LONG?

MASTER LATHE CONVERTER DOES IT IN ONE SET-UP!

(Above) The Master Lathe Converter mounted on tool post carriage of a 27" lathe milling a keyway on a 4½" diameter shaft at the rate of 1½" per minute, using the power feed of the lathe.

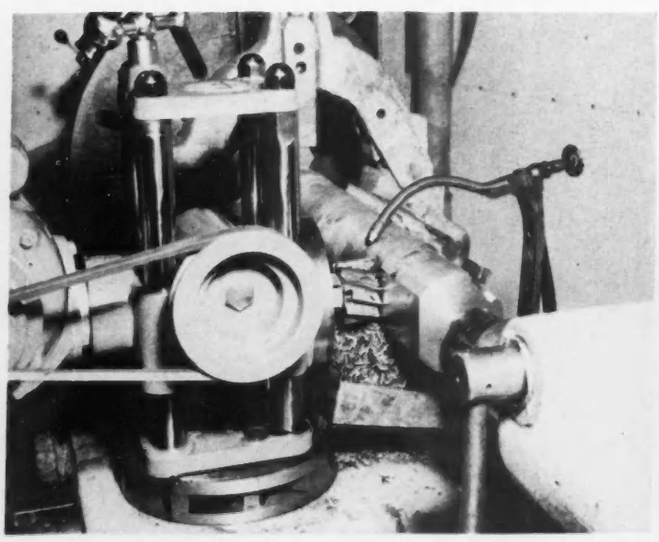
YOU CAN DO IT TOO IF YOUR LATHE WILL ACCOMMODATE WORK THAT LARGE . . .

FOR HEAVY DUTY
MILLING . . DRILLING
GRINDING . . KEYSEATING

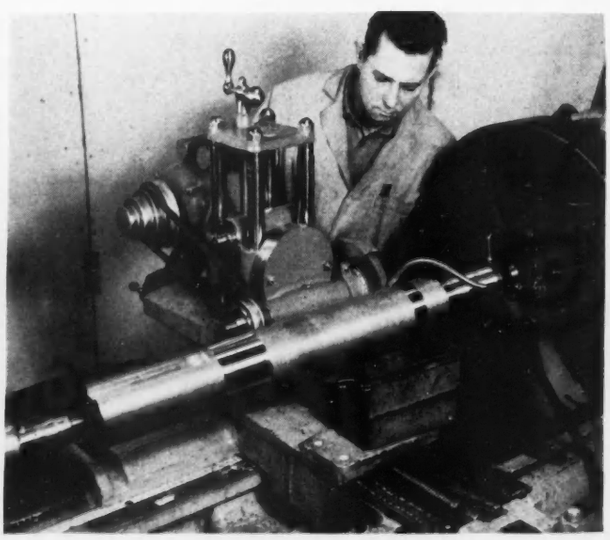
ANY LATHE IS A COMPLETE MACHINE SHOP IF YOU HAVE A MASTER LATHE CONVERTER

3 SIZES FOR LATHES FROM 9" TO 36" SWING ARE PRICED FROM $245 UP

MASTER MANUFACTURING CO.
1323 EAST AVENUE A HUTCHINSON, KANSAS

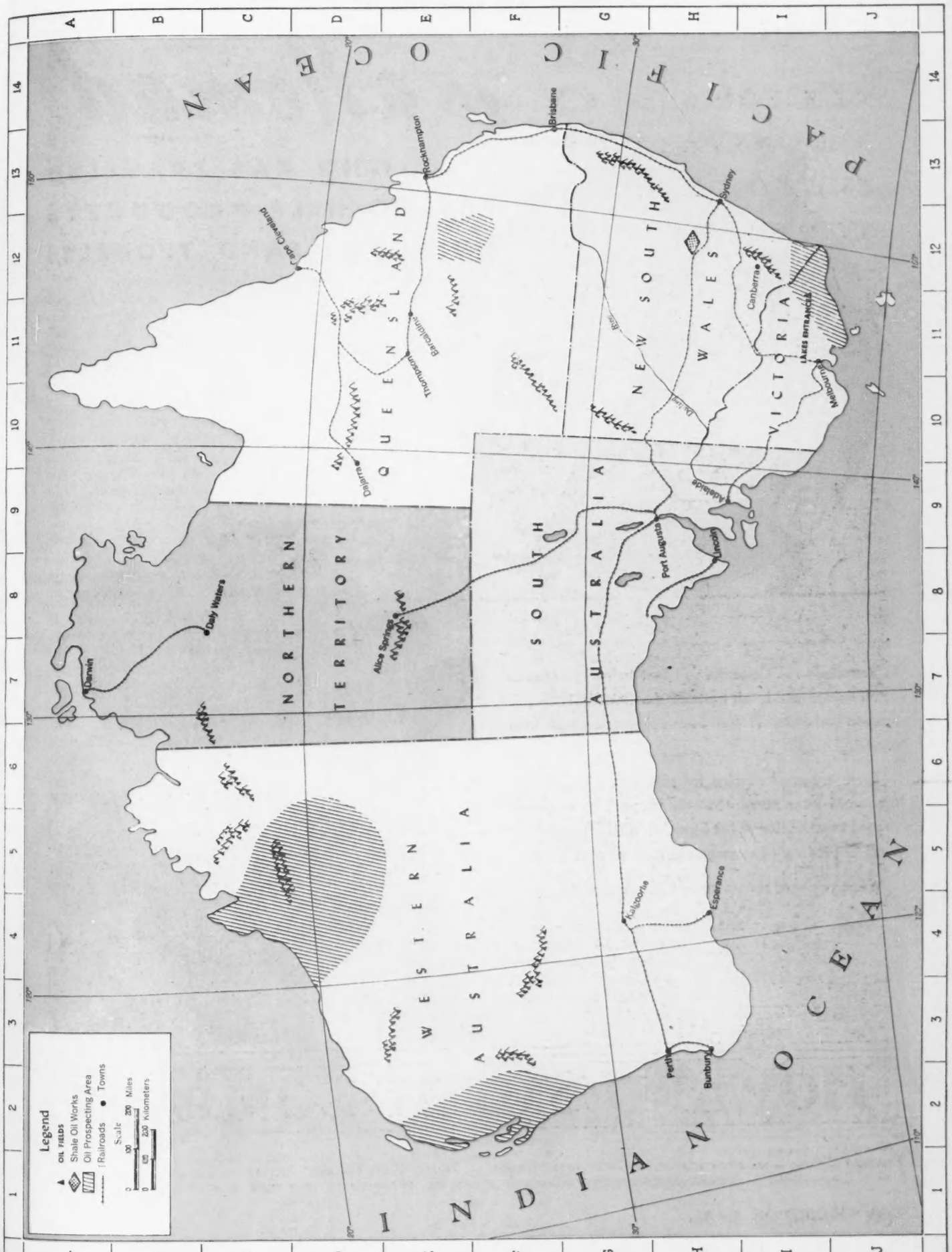


(Above) A 3" Diameter Shell End Mill mounted on the Model "M" Basic Milling Unit doing a flat milling operation on a 4½" diameter shaft held between lathe centers.



(Above) Grinding bearing surfaces with Master Lathe Converter and the Universal Grinding Head. Both Grinding and Milling, as well as turning operations, are done with one set-up of work piece in the lathe.

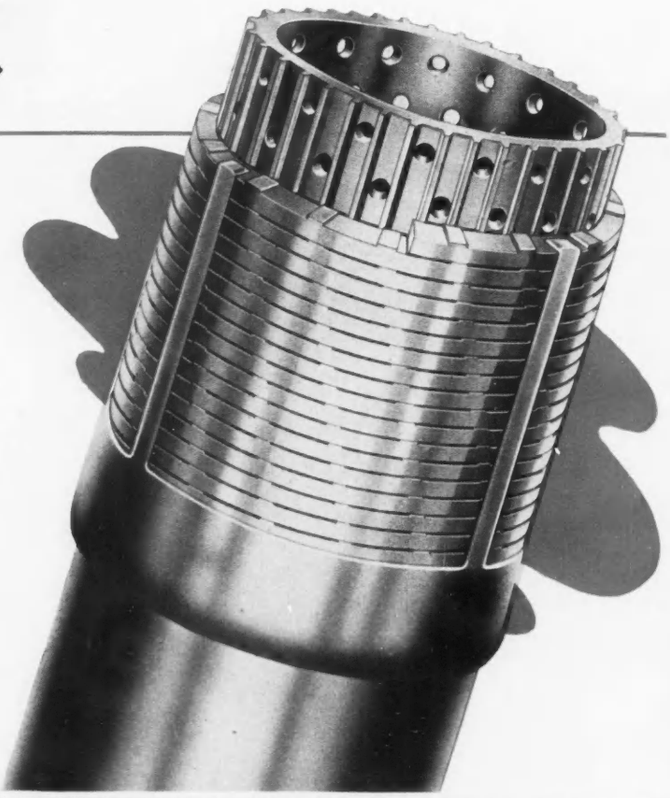
AUSTRALIA


Legend
OIL FIELDS
Shale Oil Works
Oil Prospecting Area
Railroads
Towns
Scale
Miles
Kilometers
PACIFIC OCEAN
INDIAN OCEAN
QUEENSLAND
NEW SOUTH WALES
VICTORIA
NORTHERN TERRITORY
SOUTH AUSTRALIA
WESTERN AUSTRALIA
Brisbane
Rockhampton
Sydney
Canberra
Cape Cleveland
Townsville
Charleville
Dalhart
Darwin
Daly Waters
Alice Springs
Adelaide
Port Augusta
Lincoln
Melbourne
LAKES ENTRANCE
Kalgoorlie
Esperance
Perth
Bunbury

STANCLIFF SCREEN

is a Nomad

. . . . WHO HAS TRAVELED FAR TO HELP PRODUCERS OVERCOME SAND TROUBLES



In Venezuela . . . Colombia . . . East Indies . . . Mexico . . . Trinidad and in all parts of the United States . . . you will find Stancliff Well Screen protecting wells from sand.

There are good reasons for this. Producers all over the world have found that the large inlet area and rugged construction of the Stancliff Well Screen permit them to produce oil in large volume *free from sand*.

When you need screen be sure it is Stancliff.

HOWARD SMITH COMPANY

Phone F-6363 1201 Sawyer Street HOUSTON, TEXAS P. O. Box 688

EXPORT REPRESANTATIVE: ACME WELL SUPPLY CO., 19 RECTOR ST., NEW YORK. N. Y.

AUSTRALIA—NEW ZEALAND

AUSTRALIA OIL ACTIVITY

OIL EXPLORATION in Australia, conducted on a limited scale during the war, will be renewed on an increased basis during 1946. The Commonwealth government has announced its intention of embarking on a widespread program of geological and geophysical work during the year. The government of Western Australia also proposes to increase the staff of its Geological Survey Department for the purpose of extending reconnaissance work over many little-known parts of the state. Aerial Surveys will be made.

The Shell group and other companies also are preparing to resume exploration work as soon as conditions permit.

Australia's oil production has been confined to the Lakes Entrance field in Victoria, at Gippsland, about 150 miles east of Melbourne. The discovery well was drilled in 1924 and flowed some methane gas along with a trace of oil in Tertiary beds. The oil is of asphaltic base and is found from 1100 to 1472 feet. During the war Commonwealth and State governments spent about $800,000 in sinking a shaft between 1200 and 1300 feet deep. At the base of the shaft a chamber was excavated, and it was hoped to obtain production by drilling holes horizontally into the sand. However, the plan did not work out as expected and was abandoned.

Near Portland, in Western Victoria, Commonwealth and State governments are drilling a wildcat test which has been delayed because of shortage of material. The test is below 7300 feet in the Tertiary age with no shows.

Freney-Kimberley Company which had drilled a test to 4271 feet before operations were suspended at the end of 1941, is to be deepened to 7000 feet through financial arrangements with the Commonwealth and Western Australian governments. Western Petroleum's wildcat test at Nelson, Victoria, was last reported drilling below 6800 feet.

Up to 1940 some 38 wildcat tests had been drilled in Australia but none obtained commercial production.

Interest in the development of oil shale resources was revived during the war, chiefly in the Permian Basin, west of Sydney, on which Newnes, Glen Davis, and, farther north, Baerami are located, as well as in some parts of Queensland. However, because of the expensive operation, this now is being curtailed in favor of drilling for oil deposits.

NEW REFINERIES

Plans are being outlined for the construction of new refineries in Australia. Vacuum Oil Company Proprietary is working on plans, originated before the war, to erect a plant at a cost of approximately $800,000.

Bitumen and Australian Oil Refineries, Ltd., is being organized by Standard Oil Company of California and The Texas Company to construction a plant with the raw materials to come from the Persian Gulf fields.

Salient Data on Refineries of Australia

Company, Headquarters, Address	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Cracking Capacity (Bbls. Daily)	Type of Refinery
Commonwealth Oil Ref. Ltd., (Anglo-Iranian) Scottish House 90 William St., Melbourne	Laverton, near Williamston	3500	None	Skimming
Newport Oil Ref. Ltd., Melbourne	Newport	100	None	Skimming
Shell Co. of Australia, Ltd., Bourke and William Sts., Melbourne	Clyde, N.S.W.	2750	1000	Skim-Crk

Not:—All plants in operation.

NEW ZEALAND ACTIVITY

EXPLORATION for oil in New Zealand reached a high point during the war as a result of efforts initiated by the Allied military command to boost the petroleum supply for Southwest Pacific operations following occupation of the East Indies by the Japanese.

The only oil production obtained so far in New Zealand is from a few wells at Moturoa and Taranaki in Taranaki, North Island (F-6 on map, page 307) and from the presently non-commercial Kotuku wells in Westland, South Island, (I-4 on map). Total production, 1942, was about 2050 barrels with a cumulative production as of December 31, 1942, of about 77,750 barrels. Present production is estimated at 2000 barrels annually.

For the Allied command Superior Oil Company of California, which had conducted extensive geological and geophysical explorations and had selected three prospects, drilled five tests before halting operations in March, 1943. All dry holes, ranging in depth from 2985 feet to 7100 feet, were located on North Island and along the west coast of South Island. A private company abandoned another dry hole in June, 1943.

Since 1938 at least 15 wildcat tests have been drilled, all in the vicinity of the numerous oil seeps. The first of these tests was at Totangi, near Gisborne, Auckland District, on the east coast of North Island, which was abandoned at 5700 feet. Oil of good quality was found, but not in commercial quantities. Engineering difficulties were blamed for failure to complete the well successfully. The deepest test, drilled to 10,925 feet, was at Midhurst, southeast of New Plymouth in Taranaki. Other deep tests include the Devon 1 (Taranaki) 9412 feet; Devon 2 (Taranaki) 6177 feet; Morene 1 (Gisborne) 6643 feet; Marton 1 (Wellington) 6877 feet; Mount Stewart (Manawatu in Wellington) 3395 feet. On South Island the following tests have been drilled: Kumara 1 (Westland), 5450 feet; Kumara 2 (Westland), 2980 feet, and Kawaka (Westland), 2795 feet.

Regardless of the outcome of these tests, drilling of further tests are being carried out in the Taranaki district north of New Plymouth.

GEOLOGY

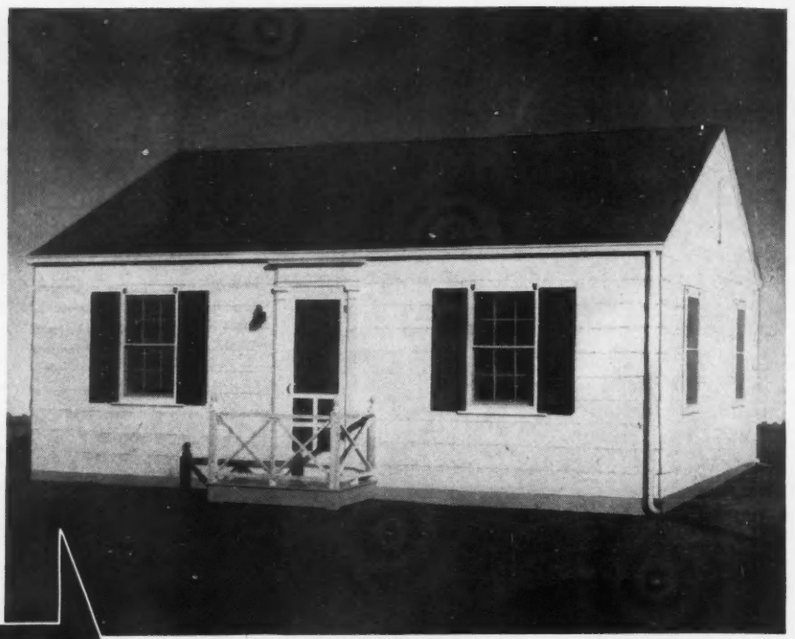
Seepages are numerous in at least ten localities. Several wells have tapped prolific but short-lived pays that have not been explained geologically, but that apparently are not present in offsetting wells. In addition, the geology of the deeper sedimentary beds is known petroliferous localities is in most cases obscured by thick gravels and clays, and in the Taranaki area by volcanic rocks at the surface. Faulting presents a further complication in the Gisborne sector.

Inasmuch as the only commercial production is in the New Plymouth area (Moturoa and Taranaki), detailed geological and geophysical surveys are progressing in southern Taranaki and western Wellington, where Tertiary rocks are believed to reach a thickness of more than 10,000 feet. The east coast of North Island, from East Cape southwestward, is the eroded rim of a Mesozoic and Tertiary basin that extends inland for many miles. Dozens of seepages have been noted along the strike of outcropping Cretaceous beds. This basin continues southwestward across most of the eastern part of South Island. Seepages have also been noted in Paleozoic beds farther south.

* * *

The cooperation of the New Zealand Geological Survey Department, Wellington, is gratefully acknowledged.

FIELD HOUSING is No Longer a PROBLEM



Field housing is no longer a problem for companies that specify STURDYBILT prefabricated, demountable buildings. We are prepared to save you time, worry and money by being responsible for your entire field housing problem from plans to erection on the site.

Specify STURDYBILT whether you need one small tool house or an oil field camp. The STURDYBILT 4' X 8' wall sections, precision built at the factory, can be adapted to suit nearly any floor plan, and they're easy to transport and erect. Write for Information.

MANUFACTURERS OF SPECIAL MILLWORK; DISTRIBUTORS OF JOHNS-MANVILLE INSULATION, ROOFING AND SIDING SHINGLES; CURTIS WOODWORK.

STURDYBILT

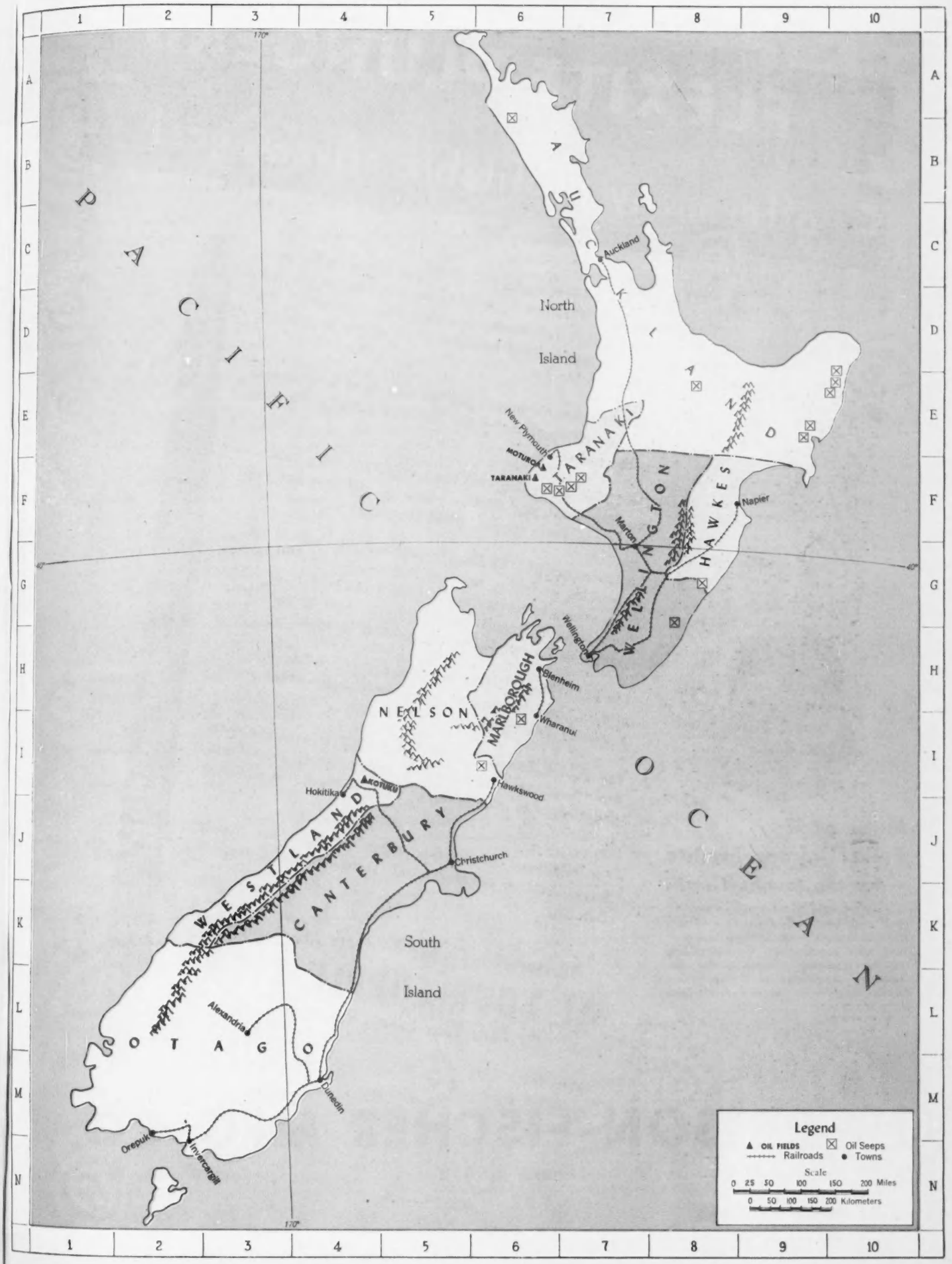
SOUTHERN MILL & MANUFACTURING CO.

• TULSA, OKLAHOMA •

Prefabricated, Demountable Houses

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125-45 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

NEW ZEALAND


PACIFIC OCEAN
North Island
South Island
AUCKLAND
Auckland
TARANAKI
New Plymouth
MOTUROA
TARANAKI
HAWKES BAY
Napier
WELLINGTON
Marton
Wellington
NELSON
MARLBOROUGH
Blenheim
Wharanui
Hawkswood
KOTUKU
Hokitika
WESTLAND
CANTERBURY
Christchurch
OTAGO
Alexandria
Dunedin
Orepuki
Invercargill
Legend
OIL FIELDS
Oil Seeps
Railroads
Towns
Scale
0 25 50 100 150 200 Miles
0 50 100 150 200 Kilometers

FLEXITE PLUNGERS

offer many profitable advantages!

Thousands of installations in U. S. and foreign wells have proven that FLEXITE PLUNGERS actually stay on the job longer, reduce rod breaks and shut-down time—and are ideal for those isolated locations where supply sources are too far and too few.

You have fewer rod breaks and less shut-down time because the free-falling action of the FLEXITE PLUNGER is easy on the rod string.

The FLEXITE Packing Ring is impregnated with graphite—self lubricating and friction reducing, and does not swell or corrode. Inner tension of the ring takes up wear.

Replacement FLEXITE Rings are lightweight, ready to run—no soaking or fitting required. You do not have to be a pump expert to replace the rings in a FLEXITE PLUNGER. The operation is quick and easy—an item of particular interest to foreign fields and isolated locations.

The FLEXITE PLUNGER is furnished in all A.P.I. sizes and also in sizes for special makes of pumps—either Insert Pumps or Tubing Pumps.

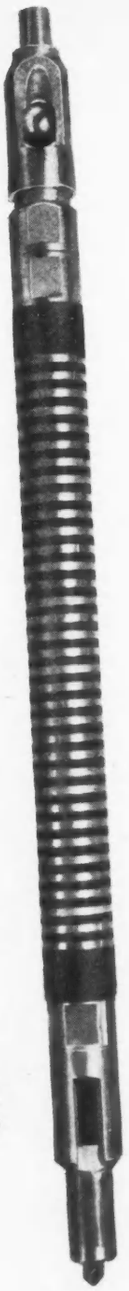
For Tubing Pumps FLEXITE PLUNGER is equipped with positive action patented valve puller. Simply rotate rods and Plunger to engage tap of puller in thread on standing valve.

For additional information either contact Your Supply Store, write us or refer to our section in the Composite Catalog.

Made of Solid Haynes Stellite

—for the toughest well!

H-F offers this Solid Haynes Stellite Ball and Seat, made entirely of this famous hard material. Here is a ball and seat combination that is giving record breaking service under the severest conditions on the toughest wells. You better inquire about 'em!



All Harbison-Fischer Products Are Available

AT YOUR SUPPLY STORE

Or Thru Your Export Representative

HARBISON-FISCHER MFG. CO.

2501 Virginia St. . . . . Phone 3-9858 . . . . . Fort Worth, Texas

EGYPT

GENERAL DEVELOPMENT

THERE are only two producing oil fields in Egypt with Anglo-Egyptian Oilfields, Ltd., being the only organization that has found oil in important commercial quantities. The fields are Ras Gharib and Hurghada.

Ras Gharib has produced about 52 million barrels and its remaining reserve is estimated as high as 55 million barrels. Discovered in 1938, the field produced 3,714,267 barrels in 1939 and steadily increased its output during World War II to about 9 million barrels in 1944. Its current daily average is estimated at 25,000 barrels.

Hurghada was an important producing area during World War I, production totaling 1,700,000 barrels in 1918. Peak production was 1,800,000 barrels in 1931. The output in 1939 was 901,206 barrels and production has declined steadily to 304,000 barrels in 1944. Current daily average output now is estimated at 1200 barrels, or about 470,000 barrels annually. The field has a total of 61 pumping wells.

There have been two other producing areas in Egypt but both fields are now exhausted. Anglo-Egyptian Company found production in the Gemsah field in 1908. Important development began in 1911 and over a 16-year period to 1927 22 wells were drilled of which 10 were producers. The field is credited with an accumulative production of 1,460,000 barrels. Oil production was found at 425 feet, 1284 feet and 1610 feet. The field is on a buried granite hill which is reflected in the surface structure, an exposed anticline.

The other field is Abu Durba, discovered in 1918, and since exhausted. The discovery was made through exploratory work of the Egyptian government and prior to 1923, the government had drilled nine wells. In 1931, the field had 15 producing wells from shallow depths. Cumulative production to the end of 1930 was about 50,000 barrels.

The discovery of a new field on the east coast of Sinai Peninsula is indicated in a wildcat test being drilled by Anglo-Egyptian and Socony-Vacuum. A good show of oil was reported in the well, known as the Sudr 1, at about 2700 feet and tests are under way.

Four companies are listed as holding concessions in Egypt. They are Anglo-Egyptian Oilfields, Ltd., Socony-Vacuum Oil Company, Inc., Standard Oil Company of Egypt (Standard of New Jersey), and South Mediterranean Oil Company, Ltd. The assets of the latter company was sold during 1945 by Standard of California and The Texas Company to Standard of Egypt, Socony-Vacuum, and Anglo-Egyptian.

The holding of each company is about 240 exploration permits and geographically the distribution of permits is Cairo-Suez, 41 permits; Eastern Desert (east of the Nile), 93 permits; Sinai Peninsula, 264 permits, and Western Desert (west of the Nile to the Libyan border and north of latitude 29) 524 permits.

REFINERIES

There are two crude oil refineries in Egypt, both being located at Suez. The largest of these plants is operated by Anglo-Egyptian Oilfields, Ltd. It has a crude charging capacity of 26,600 barrels daily and a cracking capacity of 6100 barrels daily. During 1944, the through-put of this plant totaled about 8,845,000 barrels which came from the company's production in Egypt.

Also operating at Suez is the plant of the Raffinerie de Petrole du Government, a French company. This is a small skimming plant with a capacity of about 1400 barrels daily.

Data on Drilling in Egypt

FIELD	WELLS COMPLETED IN FIELDS IN 1944				WELLS COMPLETED IN FIELDS IN 1945			
	Oil	Dry	Total Wells	Total Footage	Oil	Dry	Total Wells	Total Footage
Ras Gharib	19	..	19	44,650	12	..	12	28,620
Hurgha'a	..	3	3	8,424	..	..	..	.....
Wildcats	..	..	..	.....	..	3	3	17,733

Note—One well drilling in Ras Gharib at end of 1945.

Recent Wildcats Completed in Egypt

Section	Company, Well and Location	Date Completed	Total Depth (Feet)
Sinai	Anglo-Egyptian Oilfields, Ltd., (Shell)[1] AYUN MUSA 1,—9 miles S.E. of Suez	July, 1945	5451
Sinai	Anglo-Egyptian Oilfields, Ltd., (Shell)[1] AYUN MUSA 2,—9 miles S.E. of Suez	January, 1946	5808
Eastern Desert	Anglo-Egyptian Oilfields, Ltd., (Shell) GHARIB NORTH 2, —10 miles N.W. of Ras Gharib Field	November, 1945	6474

[1] Joint interest with Socony-Vacuum.
Note:—All tests were abandoned.

Producing Oil Wells and Production in Egypt

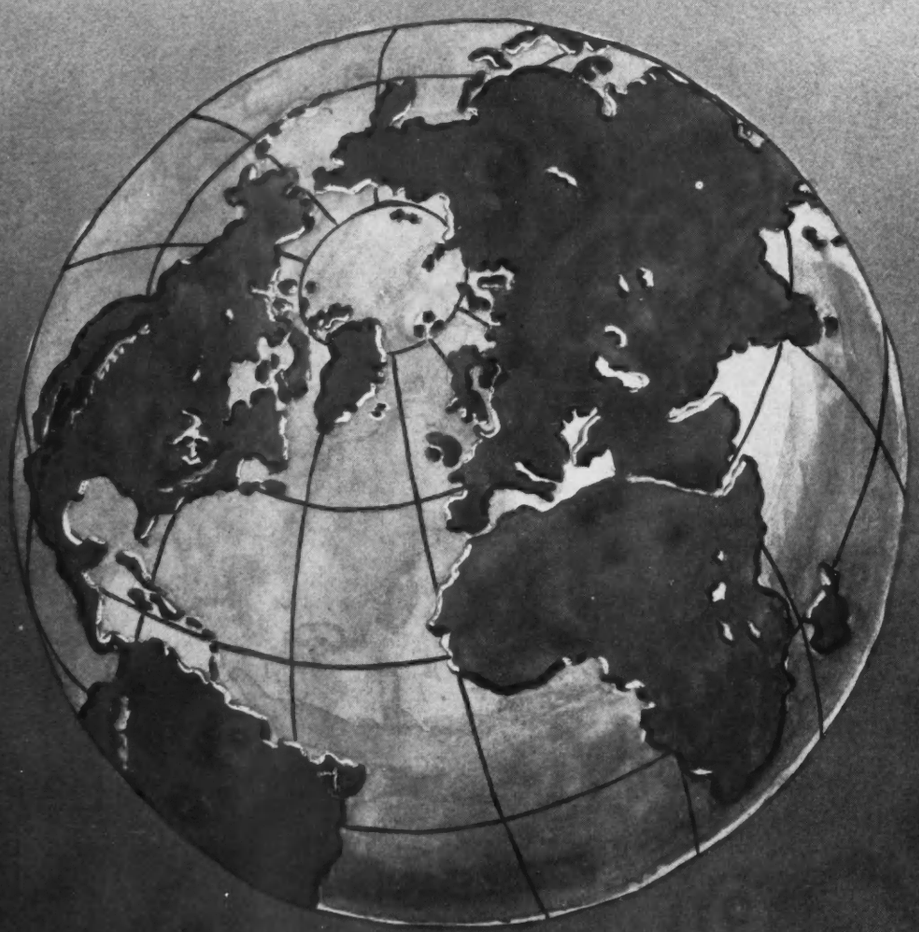
FIELD	Year of Discovery	OIL WELLS AT END OF 1945				CRUDE OIL PRODUCTION (Barrels)			
		Shut in	Producing: Flowing	Producing: Art. Lift	Producing: Total Producing	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
Ras Gharib	1938	25	24	58	82	25,000	9,000,000	9,000,000	52,000,000
Hurghada	1914	5	..	61	61	1,200	504,000	470,000	36,350,000
Gemsah	1910	2	..	..	..	.....	.....	.....	1,460,000

Engineering and Geological Data on Egypt's Oil Fields

FIELD	Location on Map Page 311	Proved Area (Acres)	Probable Ultimate Proved Acreage	Range of Gravity of Oil (API)	PRODUCING FORMATION: Name	Kind	Age	Depth of Wells (Ft.): Minimum Top Pay	Depth of Wells (Ft.): Maximum Total Depth	Average Thickness Pay (Feet)	Type Structure
Ras Gharib	F-12	1000	1300	22 to 32	Nubian	Sand Sand Lime	Carboniferous Cretaceous Miocene	1600 1600 1200	2400 2000 1900	400 75 300	Faulted Monocline
Hurghada	G-13	500	500	22 to 40	.....	Conglomerate and Sand	Miocene and Cretaceous.	700	2000	100	Faulted anticline
Gemsah	G-13	40	40	40 to 45	.....	Lime	Miocene	400	2000	100	Anticline

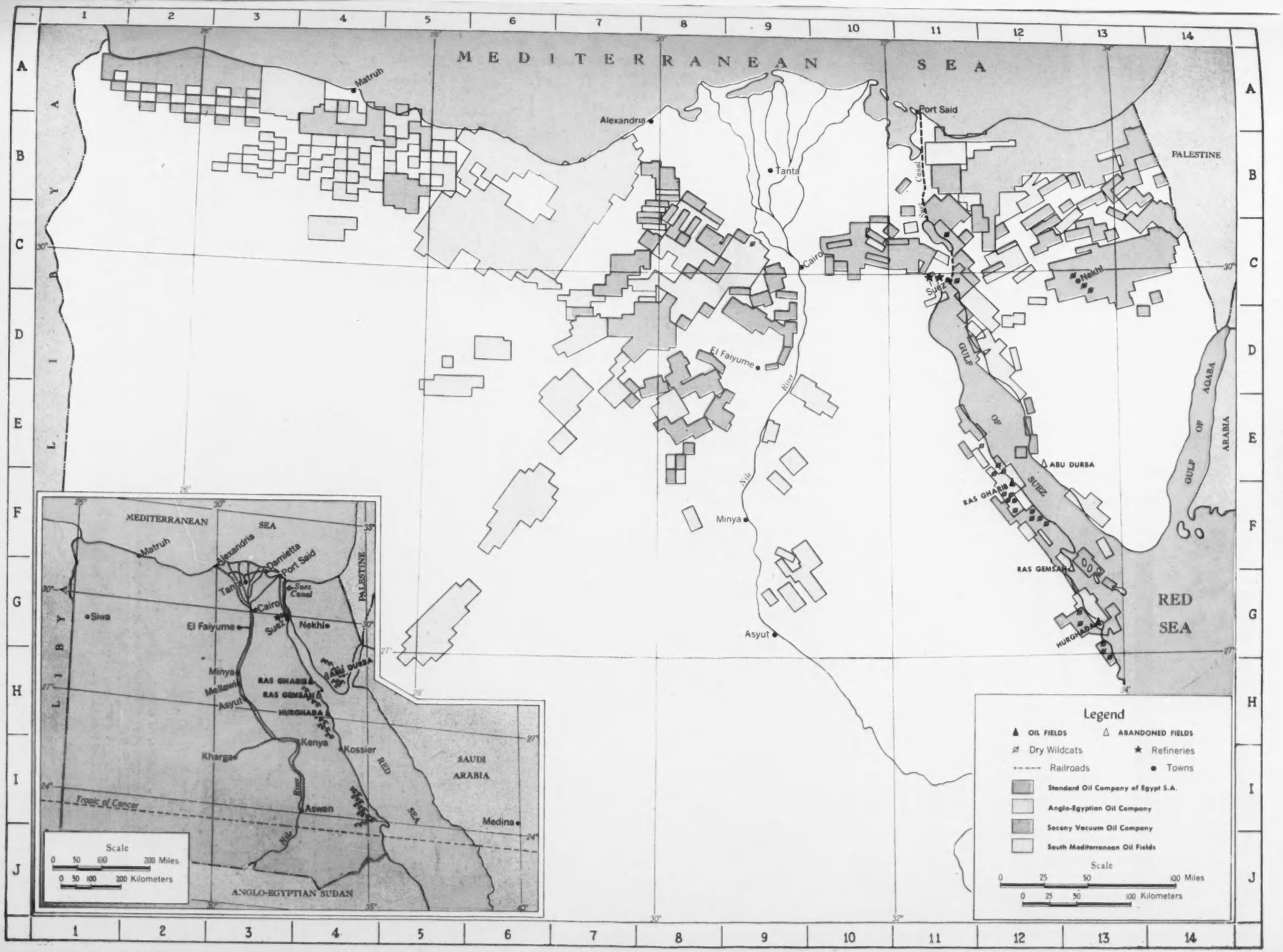
SEISMIC and GRAVITY SURVEYS in FOREIGN and DOMESTIC FIELDS

Supervision by men of long
and varied experience in
all branches of exploration



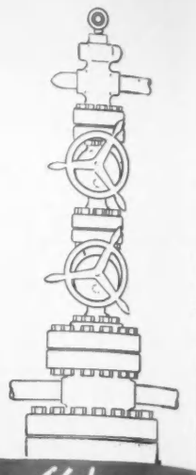
UNIVERSAL
EXPLORATION COMPANY

2044 RICHMOND • HOUSTON, TEXAS


MEDITERRANEAN SEA
LIBYA
Matruh
Alexandria
Port Said
Tanta
Suez Canal
PALESTINE
Cairo
Nekhl
Suez
El Faiyume
GULF OF SUEZ
GULF OF AQABA
ARABIA
ABU DURBA
RAS GHARIB
RAS GEMSAH
HURGHADA
Nile River
Minya
Asyut
RED SEA
Legend
OIL FIELDS
ABANDONED FIELDS
Dry Wildcats
Refineries
Railroads
Towns
Standard Oil Company of Egypt S.A.
Anglo-Egyptian Oil Company
Socony Vacuum Oil Company
South Mediterranean Oil Fields
Scale
0 25 50 100 Miles
0 25 50 100 Kilometers
Siwa
Mellawi
Kharga
Kenya
Kossier
Aswen
Medina
SAUDI ARABIA
Tropic of Cancer
Nile River
ANGLO-EGYPTIAN SUDAN
Scale
0 50 100 200 Miles
0 50 100 200 Kilometers

EGYPT

...the SAFEST, SUREST, SIMPLEST...



... well completions are RECTORHEAD equipped

SAFEST, because a stress-free weld plus the API metal ring gasket has been proved by years of service, under most severe conditions, to be the most effective, leak-proof seal for use between casing strings. **Surest,** because there is nothing to deteriorate, wear or burn out in these welded seals, so costly work-overs are not necessary. **SIMPLEST** because welding time is shorter than with any other welding arrangement, and because no additional flanges are used the blowout preventer may be easily re-attached at the same level for renewed drilling.

RECTORHEAD casing heads and tubing heads are available in a complete range of sizes and pressures to meet all well completion conditions. Complete christmas trees are designed, assembled, and tested in our plant to A.W.H.E.M. standards.

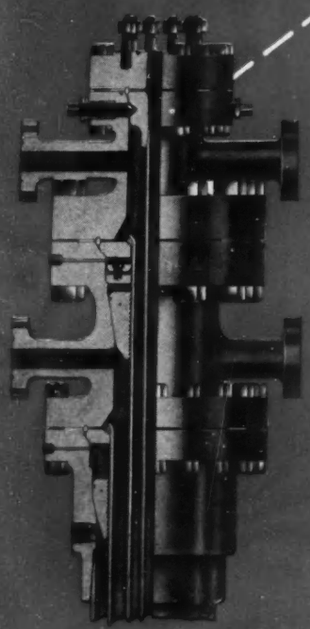
For safe, strong, permanently leak-proof well completions, specify RECTORHEADS. REMEMBER, IT'S THE DESIGN TO WHICH THE WELD IS APPLIED THAT ASSURES SUCCESSFUL WELDED SEALS.

RECTOR WELL EQUIPMENT CO., INC.

Fort Worth National Bank Bldg., Fort Worth, Texas

Export: Lucey Export Corp., Woolworth Bldg., N. Y. C.

Representatives in all active fields

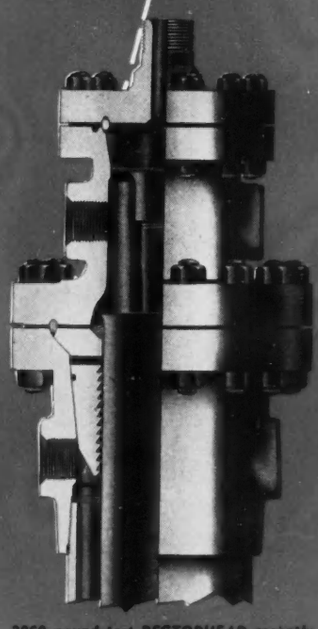


RECTOR 6000 pound test hook-up. Heads may be furnished with flanged or screwed side outlets. Casing heads show weld test pack-off between slips and welding ring, installed for purpose of making field pressure test of weld.

NO PACKING BETWEEN STRINGS

. . . That's the Reason!

RECTORHEADS are installed without the use of packing to seal off between strings of pipe. The same type of seal is used with any number of pipe strings. Eliminating the use of packing in your well heads obviates any opportunity for deterioration, wearing out, or even burning out the seal in case of fire. RECTORHEAD welded seals are safe, sure, leak-proof for the life of the well.



2000 pound test RECTORHEAD recently made available to the industry. This head uses the same all metal construction proved in our higher pressure equipment.

RECTOR

RECTORHEAD

ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS CERTIFIED

MAKING THE OIL INDUSTRY SAFER!

MOROCCO, ALGERIA, TUNISIA

ALGERIA

CRUDE oil was discovered in Algeria as early as 1904 but it was not until 1914 when the first oil field—Tliouanet in the Dhara region of the Oran district—was developed.

Since 1940, oil development in Algeria has been held back by war but increased activity was in store for 1946. Two shallow wildcat tests and 10 geological tests were slated this year, depending upon available material.

TUNISIA

There are no commercial productive oil areas in Tunisia, although search began there in 1908 with the drilling of shallow wells in an outcropping oil-impregnated sandstone near Slougia. One well found such a sand at 150-160 feet.

Since 1931 the search for oil has been conducted by the government. Oil indications are found in beds ranging from Trias to Miocene in age, and the best indications have been encountered at Ain Rhelal, Slougia, Fedj-el-hadoum, Kef-Bou Debouzs and Djebel Kebir in North Tunisia; the domes of the Hadjeb-el-Aioun and Sbeitla regions of Central Tunisia; and the Berda zone of South Tunisia.

Most recent dome drilled is Kef-Bou Debouzs. A test was drilled to 4520 feet into the Berremian of the Lower Cretaceous. However, no oil sands were encountered.

The program for 1946 is two tests in North Tunisia.

MOROCCO

Tselfat field—This field, located in the Petitjean district, west of Fez, was discovered in 1934. Last year a dry hole was drilled to 3420 feet. At the end of 1945, two tests were active, these attempting to extend the producing area and provide additional drilling during 1946. There

Bon Draa field—Three extension tests are planned for 1946, one being rigged up at the end of 1945.

Ain Hamra field—This field covers producing areas discovered in 1918 and 1942. During 1945, five oil wells and 10 dry holes, with a total drilling footage of 15,607 feet, were completed in the old sector of the Ain Hamra field. At the close of 1945 five tests were drilling and one rigging up.

During 1945 two dry holes were drilled in the new sector for total footage of 4990 feet. At the close of 1945 two tests were active and two tests were rigging up.

Oil development in Morocco is conducted by Societe Cherifienne des Petroles. Because of the lack of equipment, there was no wildcatting during the war period, 1940-45. The last wildcat drilled was the Tihili No. 1, near Tihili, which was abandoned in April, 1940, at 5347 feet in the top of the Cretaceous. Earlier wildcat tests drilled included a test 3¼ miles southeast of Petitjean which was abandoned in July, 1937, at 7065 feet in the Jurassic. The deepest test drilled was a test 3 miles east of Moulay Idress which was abandoned in January, 1939, at 9512 feet, probably in the granite. In June, 1939, a test was abandoned at 8961 feet near Sidi Slimane in the granite. This test had a gas show at 3280 feet in the Miocene Tortonian. In 1941, a test 4 miles southwest of Souk-el-Arba was abandoned in the Lower Miocene at 4198 feet.

Oil Wells and Production in Algeria and Morocco

Field, Country	Year of Discovery	Oil Wells at End of 1945			Crude Oil Production (Barrels)			
		Producing						
		Shut in	Flowing	Total Producing	Daily at End of 1945	Year 1944	Year 1945	Cumulative Through 1945
Algeria								
Tliouanet	1914	..	..	about 8	35	1500	....	....
Morocco								
Tselfat	1934							
1st Zone		..	..	10	16	10,500	5703	116,580
2nd Zone		..	..					
3rd Zone		3	..	..	[1]			
Bon Draa	1936							
1st Zone		..	..	15	26	21,000	9300	144,180
2nd Zone		2	..					
Ain Hamra								
(Old)	1918	..	..	20	....	.....	750	36,750
(New)	1942							
1st Zone		..	2	20	22	24,000	7850	....
2nd Zone		2	..	..	[1]			
3rd Zone		1	..	..				

[1] Unable to complete due to lack of material.

Refineries of Algeria and Morocco

Company	Location of Plant	Crude Charging Capacity (Bbls. Daily)	Type of Refinery	Operating Status
Algeria				
Service des Recherches Minieres	Tlinouanet 60 miles S.E. of Oran	35	Skimming	Operating
French Government in Algeria	Azrew 25 miles east of Oran	60	Skimming	Shut down
Morocco				
Societe Cherifienne des Petroles (French & Moroccan Co.)	Petitjean 40 miles north of Menknes	700	Skimming	Operating

Engineering and Geological Data, Algeria and Morocco Oil Fields

Country and Field	Location on Map Page 315	Proved Area (Acres)	Range of Gravity of Oil (API)	PRODUCING FORMATION					Average Thickness of Pay (Feet)	Type Structure
				Name	Kind (Lime, Sand, etc.)	Age	Depths of Wells (Ft.) Minimum Top Pay	Depths of Wells (Ft.) Maximum Total Depth		
Algeria:										
Tliouanet, Oran	B-10	30	39 to 47.6	Helvetian	Basal sand and conglomerate	Lower Miocene	400	2000	..	Faulted anticlines and faults
Morocco:										
Bon Draa	C-6									
1st Zone		340	45	Domerian	Hard crystalline Limestone	Lower Jurassic	650		15	Faulted anticline
2nd Zone			45	Domerian	Porous coarse oolitic Lime	Lower Jurassic	2625		..	
Tselfat	C-6									
1st Zone				Domerian	Cryst. Lime	Lower Jurassic	330		150	
2nd Zone		130	44	Domerian	Dolomite Lime		820	....	..	
3rd Zone				Domerian	Anhydrite		2625	....	40	
Ain Hamra (Old Field)	—			Helvetian	Lime	Lower Miocene	525	....	..	Faulted zone
New Field	—									
1st Zone				Tortonian	Fine-grained Lenticular Sand	Mio. Mid. Upper Oligocene	435 to 655		9	Faulted anticline
2nd Zone		300	45				2625 to 2637	....	6	Faulted anticline
3rd Zone					Sand	Lower Oligocene	3837	....	10	Faulted anticline
							4434		9	
							4674		12	

THREE GOOD SCREENS

No. 1 Emsco "Slotted"

Maximum Strength. Made from pipe, without wrapping or inserts, Emsco "Slotted" retains 80% to 85% of original collapse strength. It may be spudded or rotated without damage.

Minimum Clogging. "V"-shaped slots, milled from inside and sawed from outside, readily pass any matter which enters.

Full Capacity. Number and arrangement of slots calculated to admit fluid to full capacity of pipe, regardless of pipe size or screen gauge.

Two Styles. Emsco "Slotted" is furnished with slots spaced 3/4" or 1/2" apart. The 1/2" spacing gives 50% more opening than 3/4". Sizes from 2 1/2" to 15 1/2" are available, with regular or flush joints.

Drillable. Emsco "Slotted" can be furnished in Securaloy Drillable Pipe in 3 1/2", 4", 4 1/2", 5" and 6 5/8" O.D.

No. 2 Emsco "Wire Wrapped"

More Opening. With slots 1/4" wide x 3" long, Emsco "Wire-Wrapped" contains 50% to 60% more opening than standard screens with 3/8" drilled holes. Emsco "Double-Slotted Wire-Wrapped" (satisfactory in most instances) contains from 100% to 150% more opening.

More Effective Screening Area. Area directly over opening in pipe is only effective screening area in wire-wrapped screen. Emsco "Wire-Wrapped" provides 9 screen openings per inch, 27 for each slot. 5" O.D. Emsco screen pipe contains 162 lineal inches effective area per foot; standard drilled pipe, only 96 inches.

Greater Tensile Strength. Emsco "Wire-Wrapped" has 25% more tensile strength than drilled pipe with equal open area.

Emsco "Wire-Wrapped" is available with galvanized, bronze or stainless steel wire.

No. 3 Emsco "Gravel Packed"

Prepacked and "Tailor-made." Each unit made to meet requirements of specific well condition.

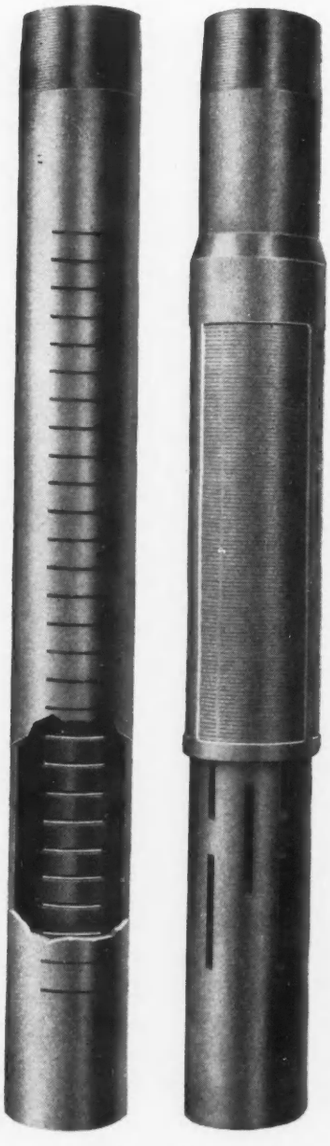
Completely Self-contained. Each joint or unit of Emsco "Gravel-Packed" is sealed with packing plate at upper and lower end to retain gravel and provide handling ease.

Hand Sieved, Pressure Packed. Gravel and sand are especially selected, hand sieved and packed under pressure to insure permanency and satisfaction.

Wide Selection. Available in units 20' or shorter, Emsco "Gravel-Packed" is furnished in slot sizes from .008 to .020 and larger, with gravel and sand packings from .012 to .060 and larger.

THERE'S AN EMSCO SCREEN DESIGNED TO CONTROL SAND CONDITIONS IN YOUR FLOWING, PUMPING OR GAS LIFT WELLS.

Inquire about them



Sectional drawing of Emsco "More Area" Slotted Screen Pipe showing the arrangement of horizontal slots spaced 3/4-inch apart, and the inside "V" shape cut which prevents clogging.

Showing a section of Emsco Slotted Wire Wrapped Screen before completion of the wire wrapping. Note that solder strips do not fall over the slots.

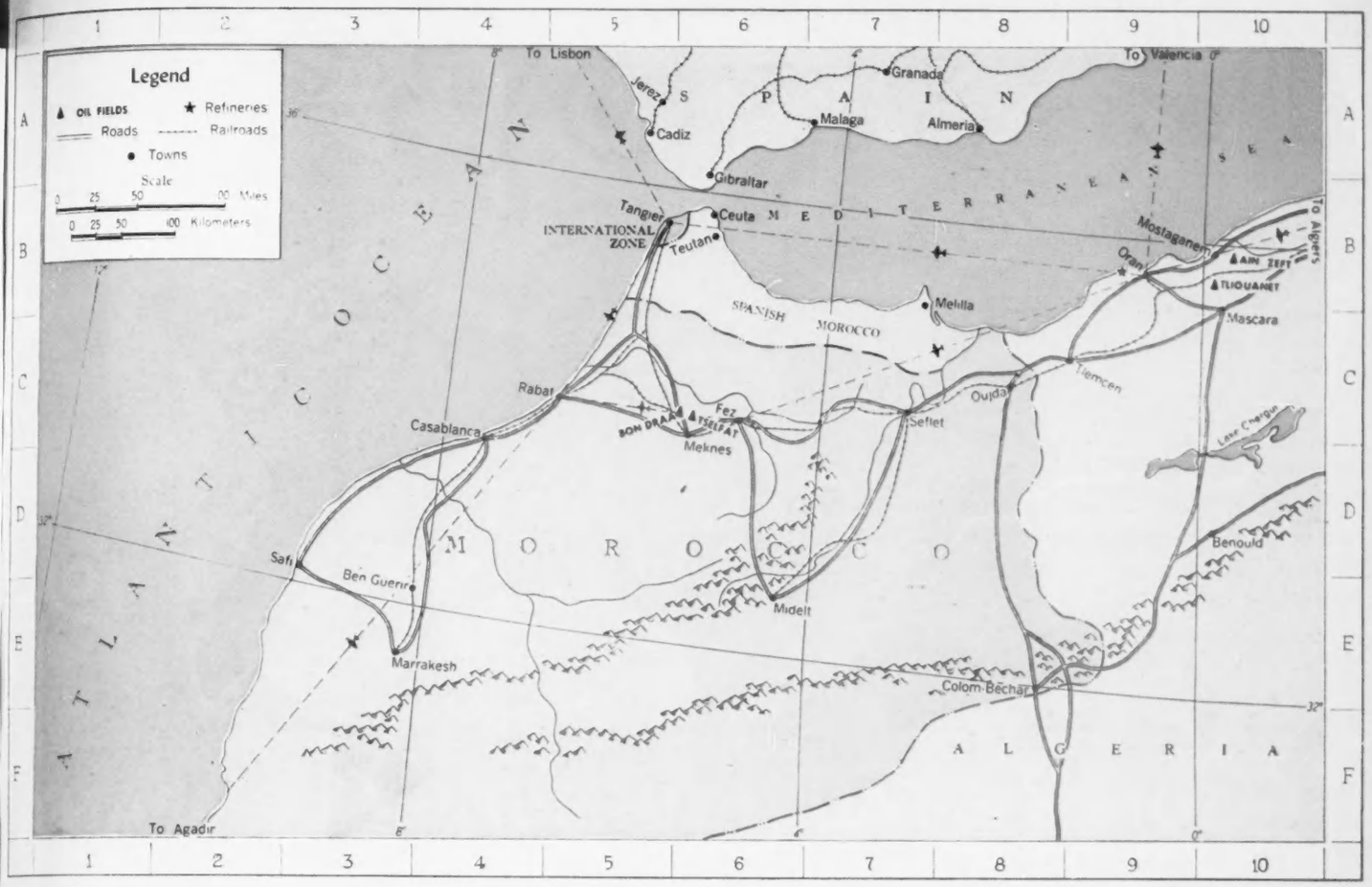
Quarter section drawing shows design and construction of Sand Packed Screen.

EMSCO SCREEN PIPE CO.

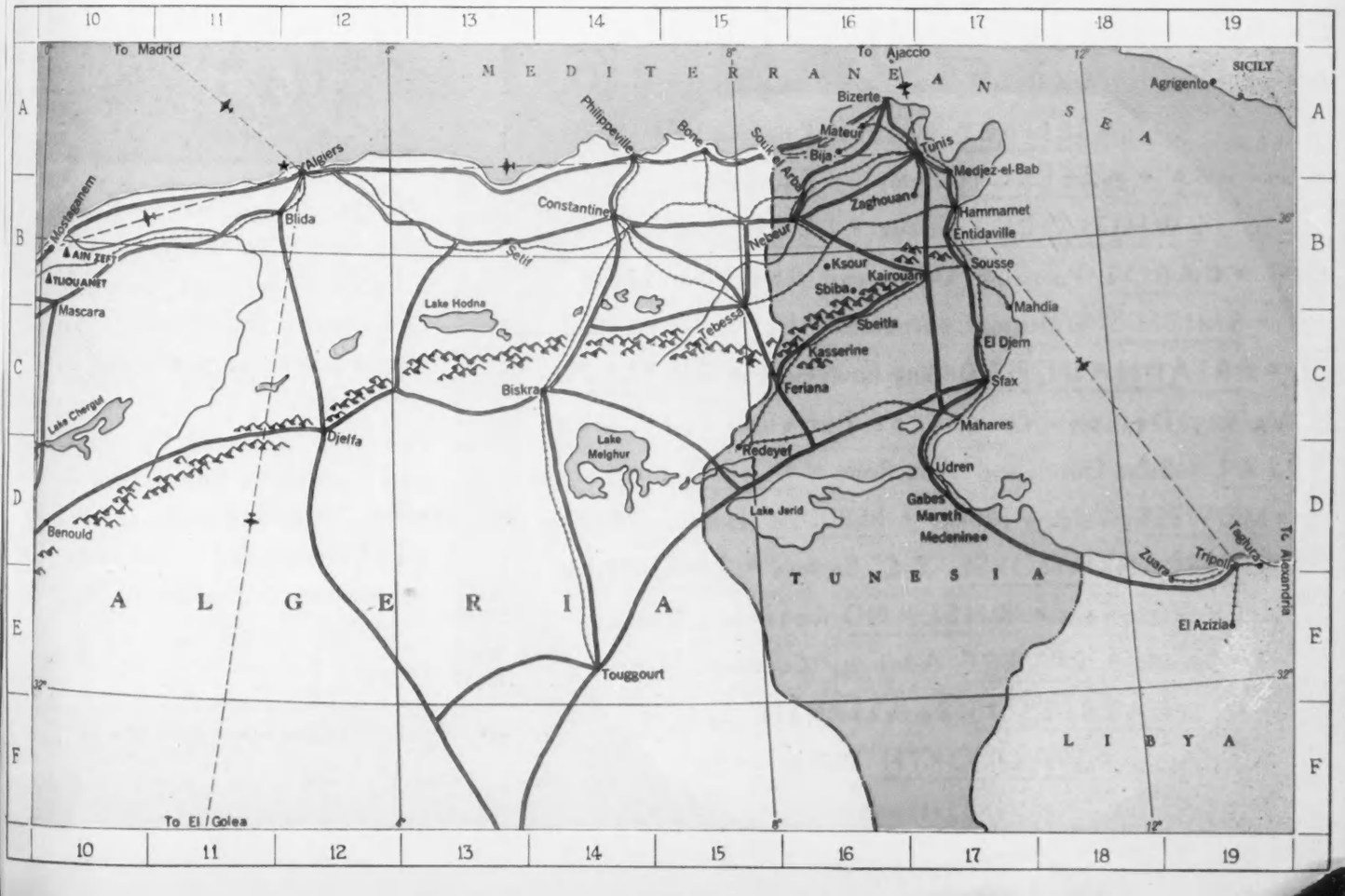
P. O. BOX 1241 HOUSTON 1, TEXAS

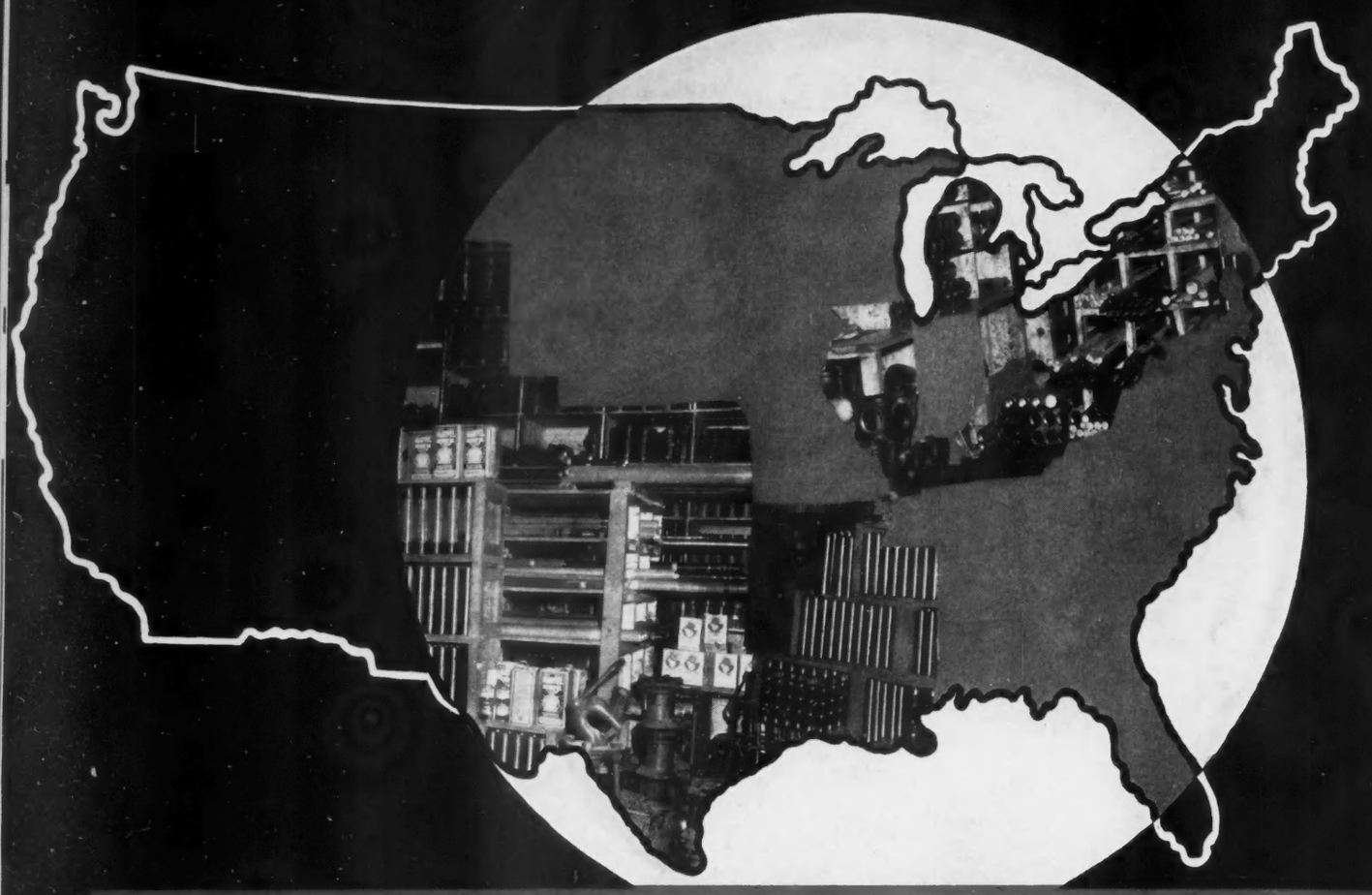
Export Representative: Val R. Wittech, 30 Rockefeller Plaza, New York 20, N. Y.

MOROCCO, ALGERIA, TUNISIA



Eastward Continuation of Above Map, Same Scale





JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary of Jones & Laughlin Steel Corporation

TULSA, OKLAHOMA

J&L STEEL

- JEFFREY Rotary Chains
- AXELSON Pumping Equipment
- WHITLOCK Cordage • LUCEY Boilers
- CABOT Pumping Units and Rod Line Jacks
- SMITH'S Welding Equipment • LINEAR Packings
- DREADNAUGHT Drilling Equipment • DARLING Valves, Darcova Valve Cups, Pumcups and Pistons
- J & L Tubular Goods and Wire Rope • KOHLER Light Plants
- MIDWEST Welding Fittings • REPUBLIC Hose and Belting
- FAIRBANKS-MORSE "Z-C" Engines • BAROID Mud Conditioners • WHELAND Rotaries, Pumps, Swivels • REVERE Admiralty Condenser Tubes
- RAYBESTOS Rotary Brake Lining
- WALWORTH Valves and Fittings

We provide you from the Rocky Mountains east with a long-established on-the-spot store and sales service. This cooperation is ideally geared to your local requirements . . . a service recognized and respected by supply and equipment buyers everywhere. A dependable service deeply entrenched in the essential routine of countless drillers, producers, pipe liners and refiners.

OTHER COUNTRIES

PHILIPPINE ISLANDS

FIRST serious exploration for oil on the islands was made about a quarter century ago by Richmond Oil Company, subsidiary of Standard Oil Company of California. Five tests, one to a depth below 5000 feet, were drilled on the Island of Luzon at Bondoc but none found commercial oil production. At the time of the Japanese invasion, Far Eastern Development Company's test on the large Danbatayan structure in northern Cebu had reached 8300 feet and was plugging back to test oil shows at about 8250 feet when equipment was destroyed to prevent seizure by the Japs. The same fate befell a test at Barili which was drilling at 2200 feet in limestone overlying the presumed oil horizon. These tests now are expected to be revived.

SWEDEN

A resurvey of the oil shale deposits in Sweden showed recoverable oil reserves to be about 28 percent lower than has been estimated. The most promising deposit, at Kinne Kulle, by core drilling showed approximately 18 million metric tons of oil-bearing shale, with an average oil content of 4.4 percent, exploitable by open cut mining. An additional 60 million tons of the same shale is available in the vicinity by underground mining. This shale is suitable for distillation processing. The shale reserves in southeastern Skane have an average oil content of only 2.1 percent, and cannot be treated by distillation methods.

TURKEY

The Turkish Mining Research Institute at Ankara has been carrying on oil prospecting work in various areas of the country in the past two years. Tests have been drilled near Romandaghi, near Mardin (close to the eastern section of the Syrian frontier) and near Murefte. In Central Anatolia, near Polati, to the west of Ankara, tests have been drilled and are said to have yielded some oil early in 1944. Several other areas in Turkey have been explored and declared favorable. Reports indicate that an American group has made attempts to secure concessions from the Turkish government. The government has also indicated the possibility of the construction of two refineries.

SPAIN

Under a decree of March, 1944, Spain is undertaking a program of development of indigenous petroleum products throughout the country. The decree proclaimed all subsurface minerals the property of the state, and their exploitation subject to concession contracts with the government on a production fee basis. The northern portion of Spain is generally regarded by geologists as offering best possibilities of commercial petroleum development. In that region possible oil-bearing Triassic beds lie beneath the Cretaceous and Tertiary formations. Provinces which are looked upon favorably include Alva, Burgos, Guipuzcoa, Navarre, Santander and Viszcaya.

PORTUGUESE EAST AFRICA

Portugal has granted concession to Manica Trust, Ltd., recently formed British-Portuguese firm, to carry out geological and geophysical explorations throughout the entire area of Mozambique, Portuguese East Africa. A considerable thickness of Mesozoic and Tertiary rocks occurs in the Mozambique. Several shows of oil and gas were found in shallow tests drilled as early as 1927 in the colony by the Inyaminga Petroleum, Ltd. (South African interests).

ETHIOPIA

An exclusive oil concession covering the 350,000-square-mile empire of Ethiopia has been granted to Sinclair Oil Corporation by Emperor Haile Selassie and field research work started early in 1946. Sinclair will pay royalties to the emperor in addition to building one or more schools and hospitals, clinics and research foundations. It also will pay for educating a number of Ethiopians in the United States for the next 10 years. The concession is for 50 years.

ESTONIA

Estonia's shale industry for some years has ranged second only to agriculture. Approximately 80 percent of this shale oil production capacity has been restored and new plants placed into operation. Total output attained by German occupational forces may be presumed to have increased over prewar levels, which ranged from 63,000 metric tons in 1936 to 190,000 metric tons in 1939. About 20 large mines are to be built in the next three years and two gigantic plants producing gas from shale will be constructed. A 160-mile gas pipe line is due to be constructed to Leningrad.

DENMARK

Danish American Prospecting Company (Gulf Oil Corporation) is renewing its exploratory efforts in Denmark. The company hopes to have a core-drilling crew, a seismic crew and a gravity crew in operation immediately, and may start drilling of a deep test before the end of 1946. The company has an exclusive concession on the entire country. Operations, started in 1938, were interrupted by the German invasion in April, 1940.

BULGARIA

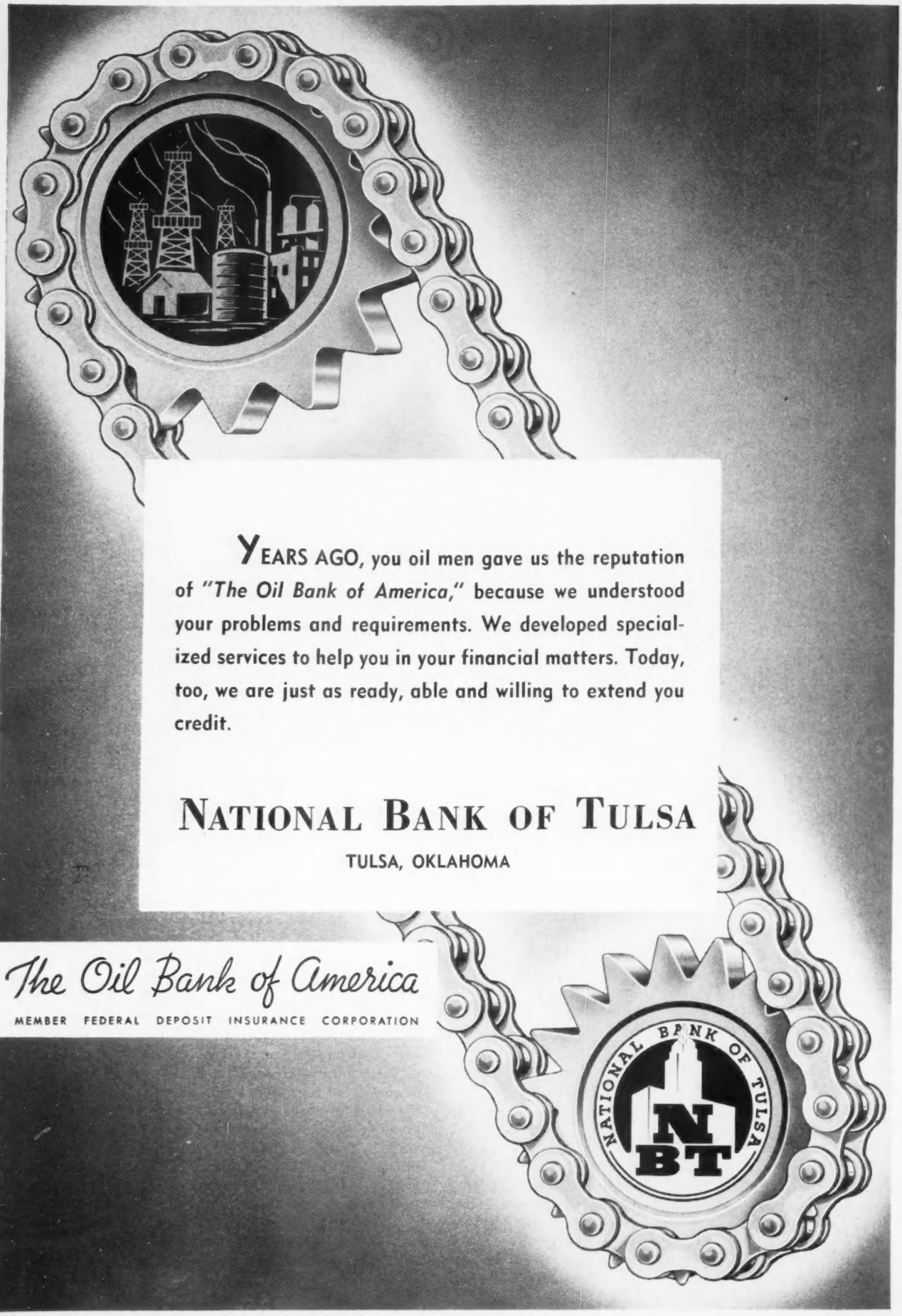
Successful experiments have been concluded in Bulgaria on the recovery of oil from shales. Necessary equipment for a national shale-oil industry is being sought. Several shallow wildcat tests have been drilled and have confirmed structures which warrant deeper tests. A test near Varna, drilled by the government in 1938, found a show of oil at 1000 feet.

AFGHANISTAN

After some exploration work, the 240,000-square-mile concession in Afghanistan, obtained in 1937 by the Inland Exploration Company, New York, a subsidiary of Seaboard Oil Company, was dropped.

SOUTH AFRICA

Oil in commercial quantities has not been found in South Africa. However, the investigations carried out by the Deparement of Mines during the past three years have included drilling of holes in rock of the Karroo System and have been aimed mainly at the acquisition of a better knowledge of the nature of these rocks at depths and their possibility of containing permeable layers which might be oil reservoirs. Oil shale or torbanite deposits are encountered on several horizons in the coal measures series (Middle Ecca) of the Karroo System, in the Bethal, Ermelo and Wakkerstroom districts of the Transvaal, and in the Utrecht and Dundee districts of Natal. The torbanite beds are generally found underlying or interbedded with seams of coal, but sometimes occur as separate seams not in association with oil. They are thin (6 inches to 5½ feet) compared with beds of torbanite or oil shale found in other parts of the world. A skimming plant with a capacity of 1000 barrels daily is operated at Ermelo, Transvaal.


YEARS AGO, you oil men gave us the reputation of "The Oil Bank of America," because we understood your problems and requirements. We developed specialized services to help you in your financial matters. Today, too, we are just as ready, able and willing to extend you credit.
NATIONAL BANK OF TULSA
TULSA, OKLAHOMA
The Oil Bank of America
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION
NATIONAL BANK OF TULSA
NBT